SECRETS of ADVANCED BODYBUILDERS

a manual of synergistic weight training for the whole body

from Health for Life

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*Also by **Health For Life:***

- **Legendary Abs**
- **Beyond Legendary Abs**
  A synergistic performance guide to Legendary Abs and SynerAbs
- **Power ForeArms!**
- **Maximum Calves**
- **The Human Fuel Handbook**
  Nutrition for Peak Athletic Performance
- **SynerAbs:** 6 Minutes to a Flatter Stomach
- **SynerShape:** A Scientific Weight Loss Guide
- **SynerStretch:** For Whole Body Flexibility

Although all the material in this course is useful to beginners as well as more advanced lifters, **Secrets of Advanced Bodybuilders** is not intended to be an introduction to weight training. Health For Life assumes the reader is familiar with the bodybuilding basics: barbells, dumbbells, sets, reps, and supersets, how to warm up, the importance of exhaling while exerting, etc.

Special thanks to
Santa Monica Bodybuilding Center
for the use of their equipment

Please note: This program contains exercises that, depending on your physical condition, may be hazardous to your health. Consult with your doctor before attempting these exercises. User assumes all risk for performing the exercises described in this course. **Use of this course constitutes a covenant not to bring any lawsuit or action for injury caused by performing exercises illustrated in this course.**

ISBN 0-944831-07-9

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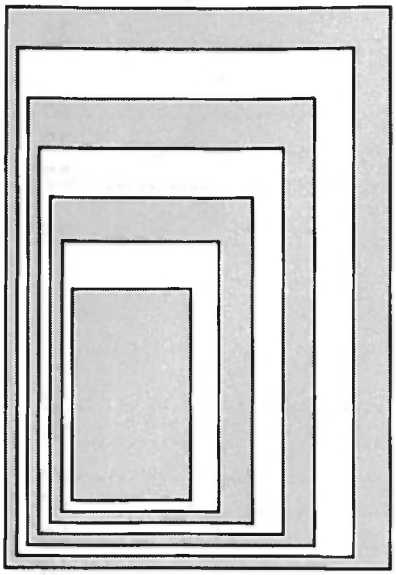
to Serge



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You can have the ultimate workout program!

...A program that gets you maximum results in minimum time. A program that builds incredible strength, definition, and bulk (any or all, it's up to you!). A program that doesn't injure your lower back, or destroy your knees, or overstress your other joints. A program that will make you the best bodybuilder you can be—or if you prefer, build you a phenomenal conditioning foundation for other sports, like martial arts or mountain climbing.

This course unlocks the secrets of that ultimate program.

Secrets of Advanced Bodybuilders is the result of 12 years of research conducted at institutions ranging from Stanford University to some of the best-known bodybuilding gyms in the U.S. It synthesizes, into a coherent **whole**, information from many sources: interviews with successful bodybuilders, studies performed on bodybuilders and other athletes, and the laws of kineseology (the scientific study of the mechanics of human movement).

It works. Because it is *specific*. The research behind the program was aimed not only at determining which exercises are most effective, but more importantly, at discovering the optimum way to *perform* and *combine* them. This is **Synergism**: creating a whole greater than the sum of the parts. The individual exercises described become many times more effective when used exactly as indicated. **It is the *details* of performance, and the *specific* sequence and timing that makes our program such a powerful conditioning tool.**

Secrets begins with an explanation of the biomechanical basis for the special techniques. First, it explores concepts behind optimum exercise form. Then it moves on to concepts concerning exercise combination—how to structure your workout to maximize results (which body part when, how many sets, reps, etc.); how to put together an intense, but short, routine; how to guarantee that each part of your workout makes every other part even more effective. This technical material is vital, because it gives you the tools you need to understand, monitor, and update your program—to fine-tune it to your personal needs and goals.

Next come illustrated descriptions of the exercises included in our routines. These also serve to illustrate the guidelines discussed in earlier sections. The descriptions are arranged by body part (chest, back, biceps, triceps, deltoids, quadriceps, and leg biceps; calves are left for a future course; abdominals and forearms are discussed in prior ones†). **Secrets** explores special training information related to each body part and explains *in detail* how to optimize each of the exercises.

Following the exercises, we come to the routines.

Here, you will find two complete programs, each progressing from beginning to advanced. Although they have different goals, each in its own way is designed to

†Legendary Abs, Power ForeArms!

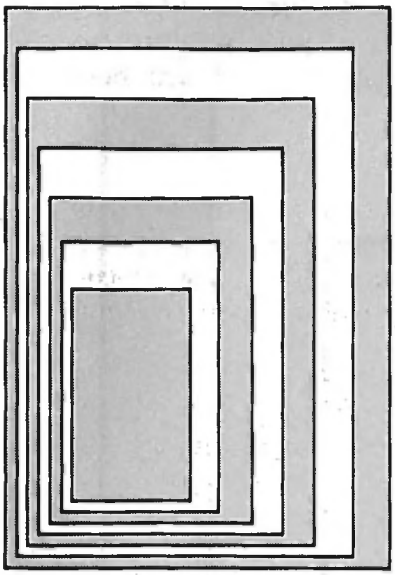
get you maximum results in minimum time. The first is called **Bodybuilder Power, Condensed.** If you have limited time to train, or if you want a quick program to supplement your martial arts or other sport pursuits, this one's for you! It will help you develop incredible strength and/or bulk in just three 30 minute workouts per week.

For the pure bodybuilding approach, there's **Bodybuilder Power, Expanded.** The individual body part workouts here are divided into levels so you can mix and match as you progress. For example, if your tricep development lags behind your bicep development, you can continue to use, say, the Level 3 tricep routine while moving up to the Level 4 bicep routine.

Finally, in "How Much, How Often," the course covers organizing your program into a three, four, or six-day split (different body parts on different days), and dispells some myths about the weekly routine. It explains, for example, why a six-day split is **not** beneficial for the advanced bodybuilder.

Good luck. We hope you will use **Secrets** to achieve the results you have always dreamed about!

* * *



IT ALL BEGINS WITH THE "REP"

Many bodybuilders conceive of a workout program as an almost random arrangement of exercises—a few for the chest, a few for the back, and so on through the body. Actually, though, one of the most important secrets behind creating the ultimate program is understanding that nothing about a workout should be arbitrary or random.

Workout structure is special. It corresponds to something called a **wholon.** Although the word "wholon" is a bit strange, the concept is intriguing: A wholon is an interactive system with many elements, where each element is complete and a **whole** unto itself. Within the wholon, progressively more complex elements are built out of simpler ones.

For example:

A person is a wholon. A person is made up of cells. Cells combine to form tissues, tissues combine to form organs, organs combine to form organ systems, organ systems combine to form the person.

A car is a wholon. Individual parts (screws, nuts, materials) combine to form larger components (carburetor, drive shaft, seats, frame), which combine to form the car.

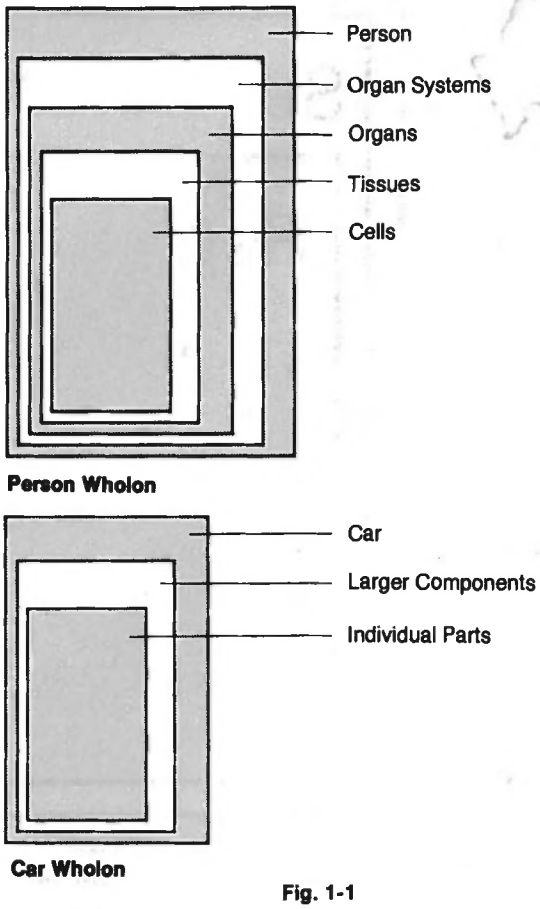
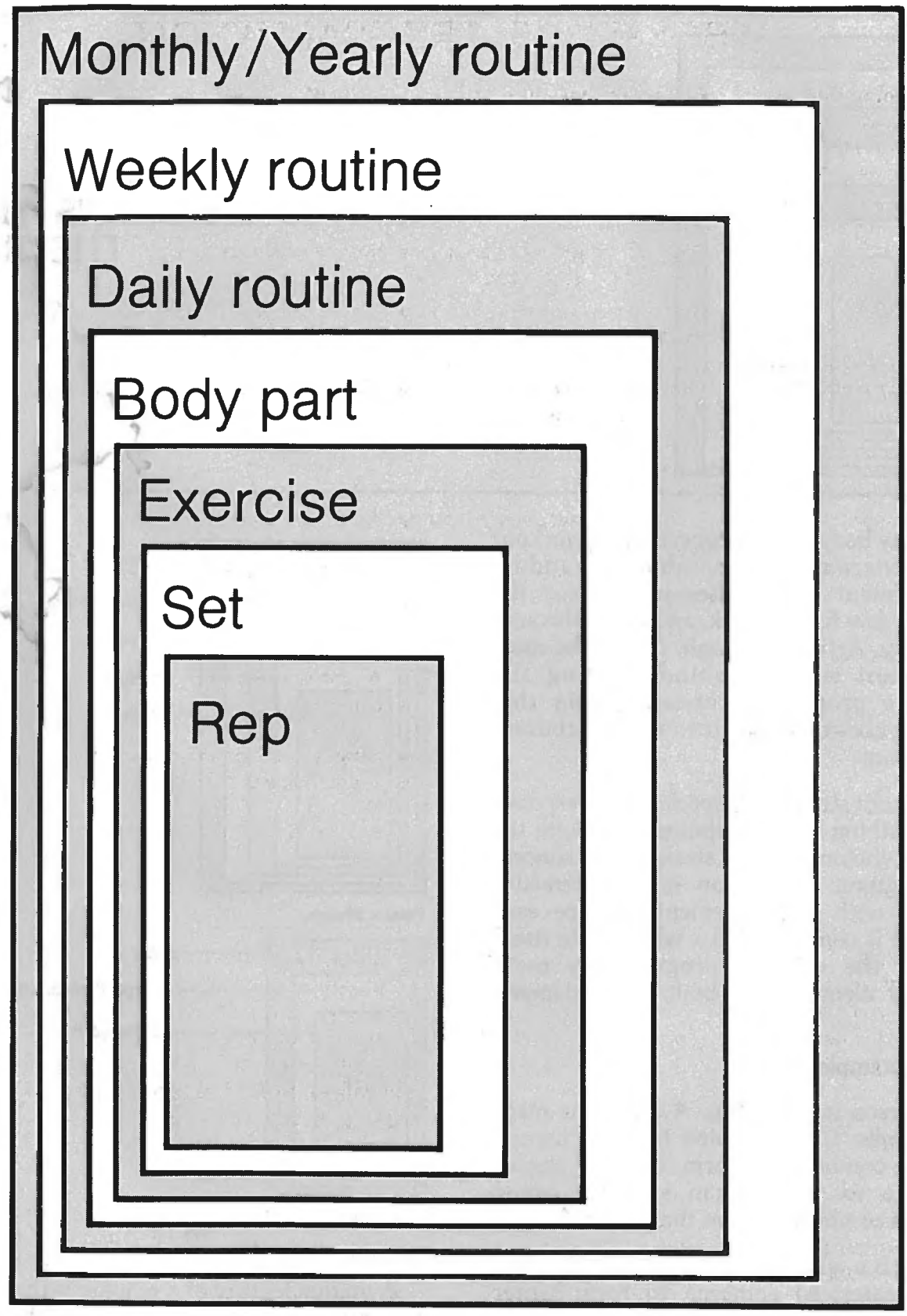


Fig. 1-1

A unique feature of a wholon is that **every element from the simplest to the most complex is crucial to the wholon's overall**



Exercise Program Wholon

Fig. 1-2

THE EXERCISE PROGRAM WHOLON

Wholon Element	Factors to Optimize	Operative Principles
Monthly/Yearly routine	▪ Number of workouts ▪ Intensity of workouts	▪ Maximum gains without Overtraining
Weekly routine	▪ Number of days ▪ Workout sequence (which body parts, which days) ▪ Rest length between workouts	▪ Whole body vs Split training ▪ Interdependency Principle ▪ Maximum gains without Overtraining
Daily workout	▪ Number of body parts ▪ Body-part sequence ▪ Rest length between body parts	▪ Maximum gains without Overtraining ▪ Interdependency Principles ▪ Fatigue/Tension Principle
Body part	▪ Number of exercises ▪ Exercise selection ▪ Exercise sequence ▪ Rest length between exercises	▪ Athlete's experience ▪ Functional Strength/Isolation Exercises ▪ Interdependency Principles ▪ Fatigue/Tension Principle
Exercise	▪ Number of sets ▪ Rest length between sets	▪ Athlete's experience ▪ Fatigue/Tension Principle
Set	▪ Number of reps ▪ Rep speed	▪ Fatigue/Tension Principle ▪ Fatigue/Tension Principle
Rep	▪ Form ▪ Leverage	▪ Line of Force, Plane of Motion Levers & Resistance ▪ Leverage Principles

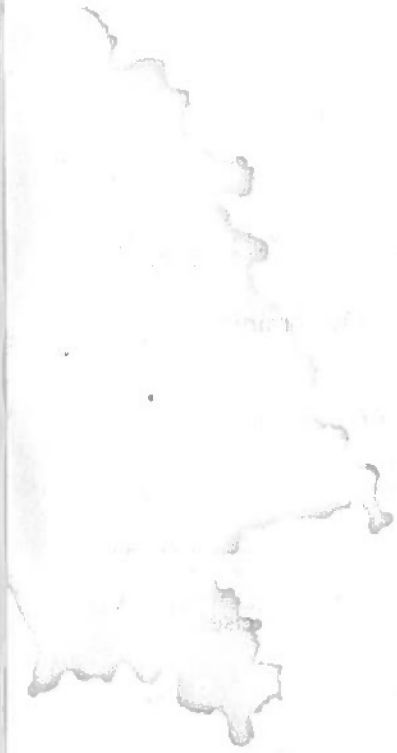
integrity. A person (the most complex element of the "person" wholon) suffers if his or her cells (the simplest element) are diseased. Likewise a car doesn't run too well if its screws fall out!

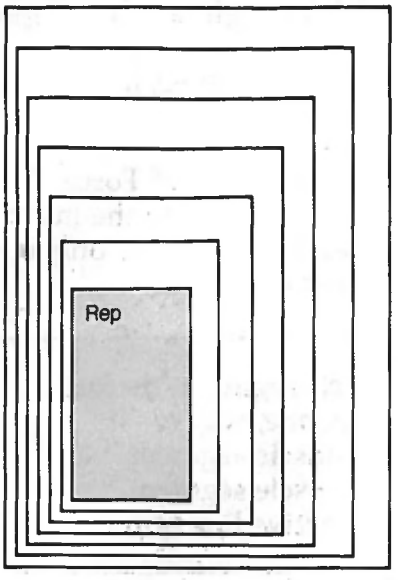
What does this have to do with your workout?

A workout program is a wholon with *the rep* as the simplest element and the *long term program* as the most complex. Just as in all wholons, every element is crucial to the effectiveness of the whole. It's not enough to do great exercises if they're combined randomly or improperly. Nor is it enough to combine exercises properly if they're ineffective or poorly performed. To create the ultimate program, every element must be optimized. Specifically, you must take a close look at every element within the workout wholon, identify the factors that affect each element, and optimize those factors.

Let's get started! The illustration above, which lists the different elements and the factors to optimize for each, will serve as our point of departure.

* * *





Factors to Optimize	Operative Principles
■ Form	■ Line of Force, Plane of Motion Levers & Resistance
■ Leverage	■ Leverage Principles

THE *REP*

FORM

The key to the perfect rep follows straight from the old cliche: a picture is worth a thousand words.

It's not enough just to know "the biceps flex the elbow" or "the quadriceps extend the knee." To optimize exercise form, you need to picture exactly how each muscle acts—what *lines of force* and *planes of motion* are involved, and how the muscle works against resistance. This is not difficult, but it is essential.

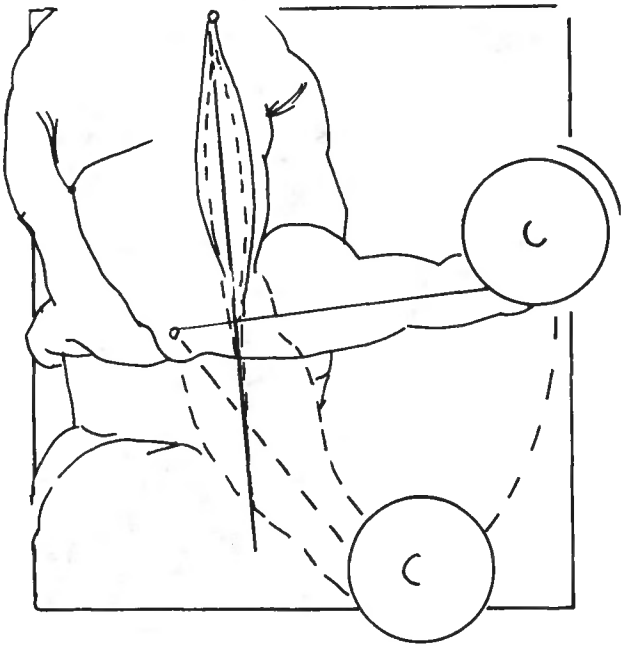
To illustrate, we must begin at the beginning—with *muscle fibers.*

Lines of Force

Every muscle is made of millions of tiny muscle fibers. Muscle fibers provide the force for movement. They do so by contracting—shortening—to about two-thirds of their original length. Individual muscle fibers always contract along a straight line.

Many muscles, like the biceps or triceps, consist of muscle fibers all running in the same direction, and so these muscles contract along straight lines, too. These muscles are called **straight muscles.**

Muscle fibers contracting along straight line



Biceps contracting along straight line

Fig. 2-1

There is a second kind of muscle, called a **fan-shaped muscle.** Fan-shaped muscles, like the pectorals (the fibers of which fan out from the shoulder across the chest), act like several straight muscles arranged in a fan. Each **segment** of a fan-shaped muscle contracts along a single line.

For example, the pectorals act as if they are divided into three segments, upper, middle, and lower. Therefore, you must do three movements, three separate exercises, to fully develop them: Incline Bench for the upper pecs, Supine Bench for the middle pecs, and Decline Bench for the lower pecs. The important point here is the idea of *a single line of contraction per muscle segment.*

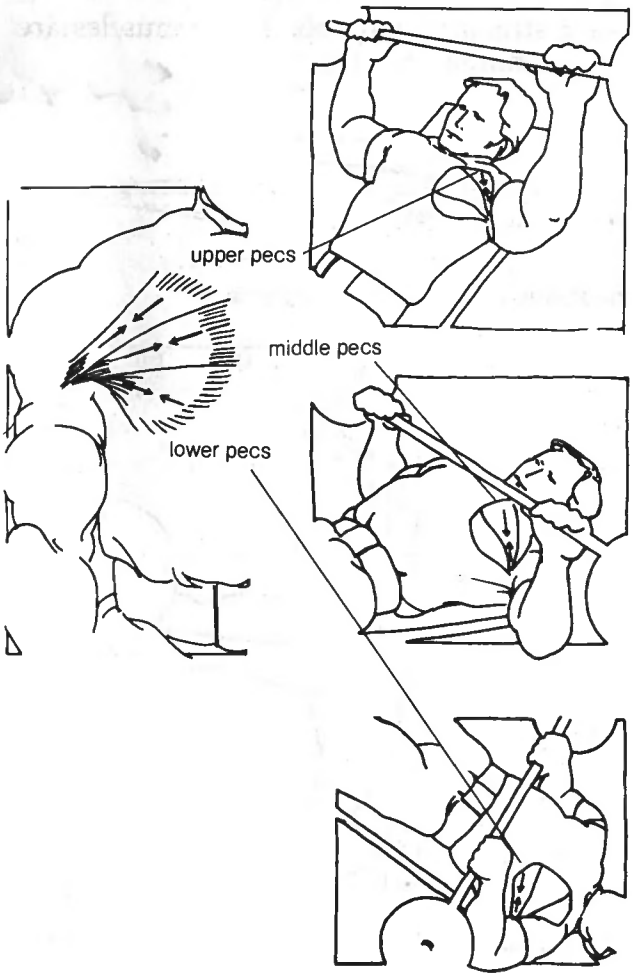


Fig. 2-2 Pectorals contracting along three different lines

To generalize: although a fan-shaped muscle can contract along several lines, in effect, just like a straight muscle, it contracts along only one line at a time.

This line is called the **Line of Force**. The Line of Force is always parallel to the muscle fibers in a muscle segment. **There is only one line of force per muscle segment.**

> ■ **For any muscle segment, there is one, and only one, way in which that muscle segment pulls. Each muscle segment has its own distinctive line of force.**

Levers and Resistance

Now, muscles by themselves can't do much more than contract. To cause movement, muscles have to work with bones. Together, a muscle and a bone create a **lever.**

A lever actually has four parts, as illustrated in the Teeter Totter example below. The Teeter Totter board functions as what's called the *lever arm* (1), the pivot functions as *fulcrum* (2), the weight of the person at the high end provides the *force* to move the Teetor Totter (3), and the weight of the person at the low end provides *resistance* (4).

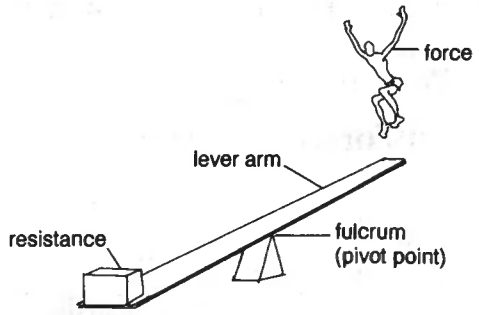


Fig. 2-3 The four parts of a lever.

In your body, bone functions as lever arm, joint as fulcrum, muscle pull provides force, and whatever you are pushing or pulling against provides resistance.

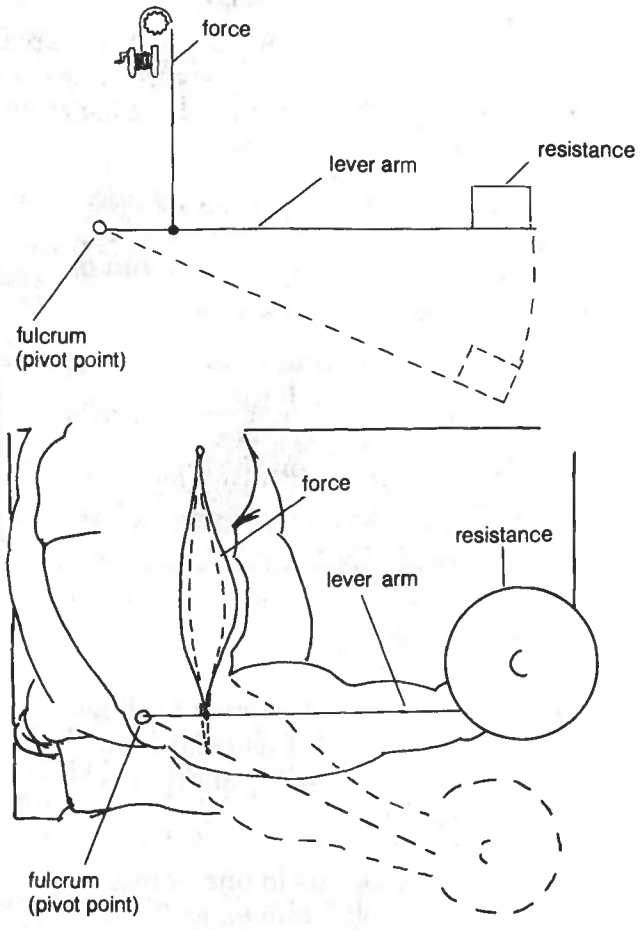


Fig. 2-4 In a muscle/bone lever, muscle pull provides the *force*, the bone is the *lever arm*, the joint is the *fulcrum*, and the weight is the *resistance*.

Each muscle/joint/bone system is an individual lever.

The {biceps + elbow + forearm} is one.

See figure 2-4 above.

The {quadriceps + knee + lower leg} is one.

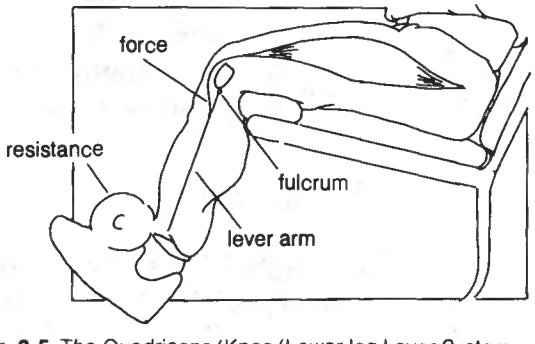


Fig. 2-5 The Quadriceps/Knee/Lower leg Lever System

And so on for every joint in the body. Through a muscle/joint/bone lever system, you can bring a muscle segment's single line of force to bear on external resistance, like a barbell. That's what you are doing when you lift a weight.

Now, every lever must be positioned properly to do its job. A car jack, for instance, won't work if you put it under a car at an angle. The weight of the car (resistance) is pushing straight down, and unless the jack is pushing straight up, you're going to have a difficult time getting the car off the ground!

Likewise, for every exercise, there is a particular body position—*a particular orientation of the muscle/joint/bone lever(s) involved*—that lets a muscle push or pull most directly against the external resistance.

This is called an exercise's **Ideal Orientation.**

Any deviation from Ideal Orientation decreases the effectiveness of the exercise by diminishing the stress on the target muscle segment.

For example, when doing a bicep curl, the bicep's line of force is parallel to the upper arm—in this case, essentially straight up—and the direction of resistance is straight down.

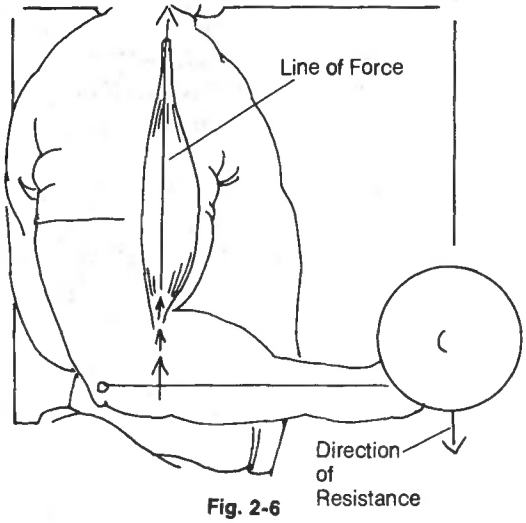


Fig. 2-6

If you put your elbow out to the side and do the curling motion, the Line of Force for the biceps follows the upper arm, and is no longer aligned with the resistance; they are at right angles to one another.

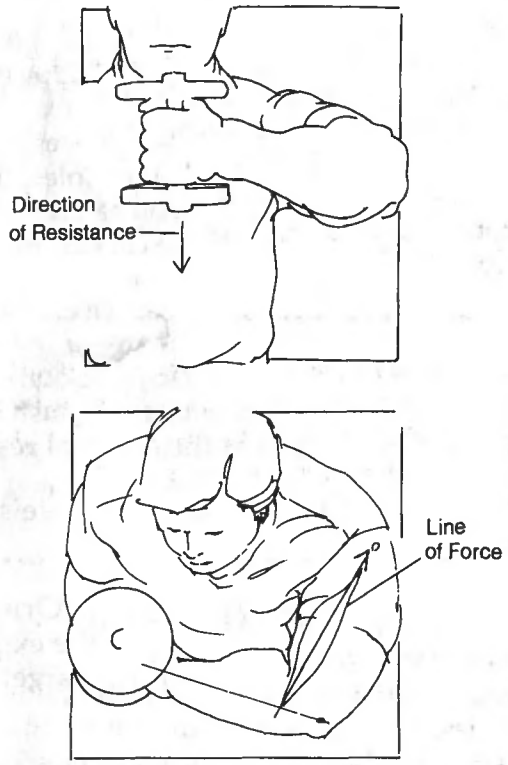


Fig. 2-7

As far as working the bicep is concerned, one of these orientations is clearly more efficient than the other!

Exercises employing the Ideal Orientation minimize joint stress and wasted energy, and maximize concentration on the target muscle group.

An optimal exercise for a given muscle will always involve the Ideal Orientation—it will always align the Line of Force with respect to resistance. Sounds simple enough. But it's surprising how many "standard" exercises break this rule!

- **Muscle segments work within lever systems against resistance.**
- **There is an *Ideal Orientation* that aligns the Line of Force with respect to the direction of resistance.**
- **Exercises that use Ideal Orientation minimize joint stress and wasted energy, and maximize concentration on the target muscle group.**

Planes of Motion

We have seen how movement follows *lines of force*. Now we must associate movement and lines of force with another concept: **Planes of Motion.**

All movement occurs in one or more planes of motion. "Simple" movements, like most weight training exercises, usually take place within a single plane. In the illustration on the next page you can see the planes in which several common exercises occur.

Just as each lever system has an Ideal Orientation, so each exercise has an Ideal Plane of Motion. In fact, one determines the other. If you perform an exercise in Ideal Orientation, your movement will define the Ideal Plane of Motion.

For example, when doing a free weight Bicep Curl, the arcing movement from Ideal Orientation (elbow facing straight down) defines the Ideal Plane (plane perpendicular to the ground).

As a general rule: **All body segments involved in an exercise should be moving within, or at least parallel to, the Ideal Plane of Motion for that exercise.** If they're not,

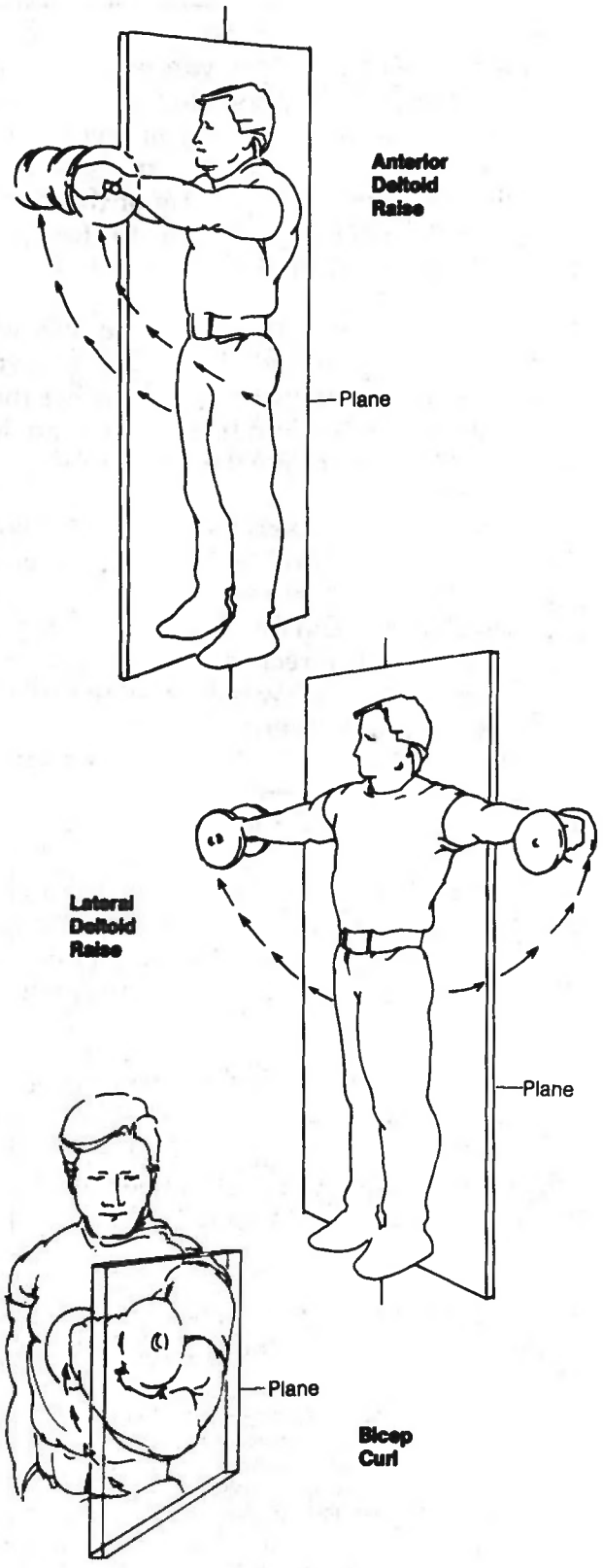


Fig. 2-8

you are wasting energy and subjecting joints to unnecessary and possibly damaging stress.

Indeed, an efficient free weight bicep curl is one where all moving body segments move within the plane described above. If, for example, your elbow is off to the side, outside the plane, you are stressing it in a way you shouldn't be, and are decreasing the effect of the exercise on your biceps. Think about the extreme case: If you were to position your arm as in Fig. 2- 7 on the previous page, you wouldn't get much of a bicep workout, but you would put one heck of a stress on your elbow!

- **An efficient exercise calls for all movement to take place within (or at least parallel to) the Ideal Plane of Motion for that exercise.**

You may be thinking this was an awfully long way around to describing an exercise you probably already knew how to do correctly. But for many other exercises, especially those involving more than one joint action (like most pull-down and pressing motions), the Ideal Lines and Planes are not so obvious.

In fact, in many cases, the "common knowledge" way to do the exercise is just flat out wrong! And the most effective way to discover that is to visualize in terms of planes of motion and lines of force.

In the Exercise Section, we will illustrate the planes of motion and lines of force for each of the major body parts and will take a look at how to make some good exercises great by improving their lever orientation.

LEVERAGE

There is another factor that influences exercise efficiency: **Leverage.** Leverage affects how heavy a weight "feels" during different parts of an exercise. Overall leverage is a result of the combined influences of two things:

- the way strength for a muscle/bone lever system varies with movement
- the way resistance during a specific exercise varies with movement.

Both are results of how muscle (force), bone (lever), and weight (resistance) interact.

Ever see a screen door held closed by a spring? When the door is all the way open, the spring can't pull against it efficiently, so it starts to close slowly. But once it gets partially closed, the spring can pull against it efficiently, and it SLAMS SHUT!

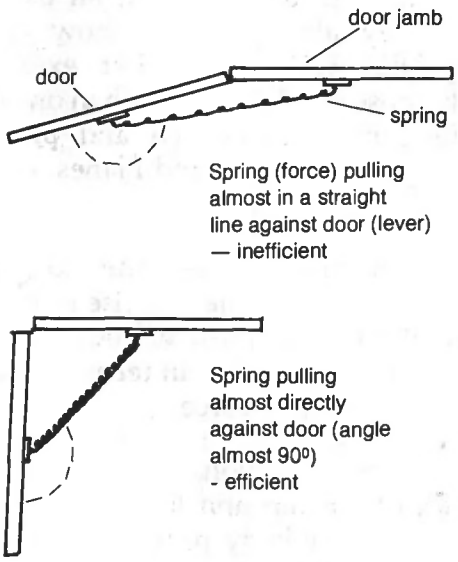

door jamb
door
spring
Spring (force) pulling almost in a straight line against door (lever) — inefficient
Spring pulling almost directly against door (angle almost 90º) - efficient

Fig. 2-9 Screen Door — top view

In the body, each bone is like a door, and its corresponding muscle is like a spring. And just like the door and spring, each muscle can bring more force to bear on its associated bone at certain angles than at others. That's why you have different levels of "strength" depending on the orientation of the bone lever. For example, when you do a curling motion, you are strongest just shy of one-half the way through. When you reverse the motion and extend your arm, you are strongest close to the beginning of the move (specifically, when upper-arm to forearm angle is about forty degrees).

Each joint action (bending the elbow, straightening the elbow, etc.) has its own **strength curve.** This curve is a picture of the associated muscle's strength at every angle in the joint's range of motion.

Likewise, each exercise has it's own **resistance curve.** The resistance curve is a picture of how heavy the weight feels at every point during the exercise. (Depending on the angle between the direction of resistance and the bone lever, the weight you're lifting "feels" heavier or lighter.)

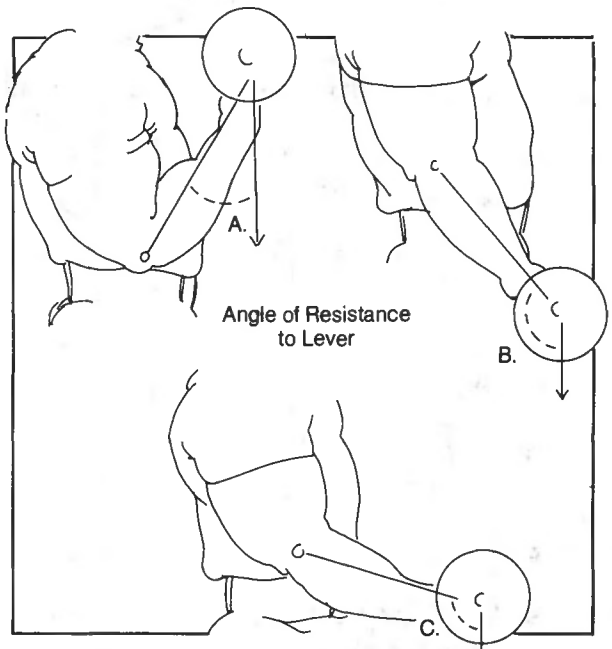


Fig. 2-10 A. Small angle of resistance—weight feels light.
B. Large angle of resistance—weight feels light.
C. 90º angle of resistance—weight feels heavy

Every muscle group has its own strength curve.

Every exercise has its own resistance curve.

An efficient exercise pits a muscle against resistance that varies directly with the muscle/bone system's strength curve. More strength, more resistance. Less strength, less resistance.

In the Exercise Section, we will explain how to change the way you perform certain exercises to more closely match resistance to leverage.

THE *REP* — A QUICK REVIEW

LINES OF FORCE...

- Muscle segments always contract along one line. This line is called the **Line of Force.**
- Muscle segments work within lever systems against resistance.
- There is an **Ideal Orientation** that exactly aligns the Line of Force with respect to resistance.
- **Exercises that use Ideal Orientation minimize joint stress and wasted energy, and maximize concentration on the target muscle group.**

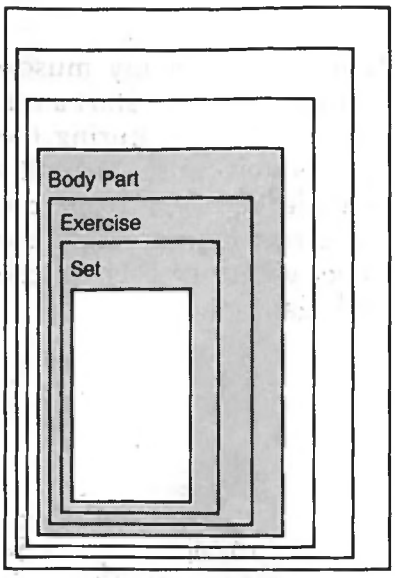
PLANES OF MOTION...

- Just as each muscle/bone system has an Ideal Orientation, so each exercise has an Ideal Plane of motion.
- **In an efficient exercise, all relevant movement takes place within (or at least, parallel to) the Ideal Plane of Motion for that exercise.**

LEVERAGE...

- Any muscle group has its own unique strength curve; any exercise exhibits its own unique resistance curve.
- Overall leverage is a result of the combined influences of these two factors.
- **An efficient exercise pits a muscle against resistance that varies in accordance with the muscle's strength.**

* * *



Factors to Optimize	Operative Principles
■ Number of exercises	■ Athlete's experience
■ Exercise selection	■ Functional Strength/Isolation Exercises
■ Exercise sequence	■ Interdependency Principles
■ Rest length between exercises	■ Fatigue/Tension Principle
■ Number of sets	■ Athlete's experience
■ Rest length between sets	■ Fatigue/Tension Principle
■ Number of reps	■ Fatigue/Tension Principle
■ Rep speed	■ Fatigue/Tension Principle

THE *SET, EXERCISE,* AND *BODY PART ROUTINE*

So far, we have been talking about factors contributing to the optimum *rep*. Now, let's move on to the next element and take a look at those factors contributing to the optimum *set*.

THE FATIGUE/TENSION PRINCIPLE

Researchers have spent a lot of time trying to figure out what makes muscles grow. They've understood pieces of the puzzle for some time—the idea of **overloading**, for example. We all know forcing ourselves to lift more than we think we can lift is essential to growth.

We also know **timing** is important. All three of the following limit growth: doing individual reps too slowly within a set; resting too long between sets; not resting long enough between workouts.

These two principles—overload and timing—have produced the well-known formula for muscle growth/strength increase:

- ☐ do three to five sets
- ☐ use a weight with which you can only do six to eight reps
- ☐ work at a moderate pace
- ☐ work a bodypart no more than three times per week.

Now we introduce a new wrinkle. Recent research has shown that timing and overload are not independent of one another. It's not a question of just finding the *best timing* or just determining the *optimal overload*. These two are inextricably intertwined. For a particular overload, there is a maximum allowable amount of rest. For a particular amount of rest, there is a minimum overload necessary for maximum growth.

If, for example, you lift 80% of your max weight, you must rest no more than 30 seconds between sets to sustain maximum growth. If, on the other hand, you use 95% of your max, you can rest about one minute and still sustain maximum growth.†

Timing and Overload act together. One determines the other.

†Numbers listed are for the intermediate bodybuilder—1 to 2 years' training. These numbers change depending on the lifter's experience.

Overload creates a particular **tension level** in a muscle. The greater the weight you lift, the greater the tension level:

Greater overload (more weight) → Higher *tension* level

The speed with which you perform your reps and the time between sets creates a particular muscular **fatigue level**. The faster you work, and the less time between sets, the higher the level of fatigue:

Greater rep speed, Shorter rests between sets → Higher *fatigue* level

In combination, these two factors determine your **Fatigue/Tension Level**. This is a way of expressing that it is the combined effect that reflects how "hard" you have worked. We can say...

Fatigue plus tension → Amount of work done

Increase the fatigue level (faster reps, less time between sets), and it takes less tension (less weight) to achieve the same Fatigue/Tension level. Decrease fatigue (slower reps, more time between sets), and it takes more tension (more weight) to achieve the same Fatigue/Tension level.

Now for the interesting part. It turns out muscle growth depends not only on overloading, not only on timing, but on **surpassing a particular Fatigue/Tension level** called the **Fatigue/Tension *Threshold***. Unless your exercise scheme (overload plus timing) bumps you over this threshold...no growth!

This has some interesting implications for structuring an optimal workout. It means **overall** workout speed is important, as well as length of rest between sets and speed of reps within sets!

Fatigue

You see, the fatigue level of any muscle is constantly changing. Before you start a set, the muscle's fatigue level is low; during the set, it rises; as soon as you finish, it begins to drop as the muscle recovers from the effort. In fact, if you rest long enough, the muscle's fatigue level will drop back to the level from which it began.

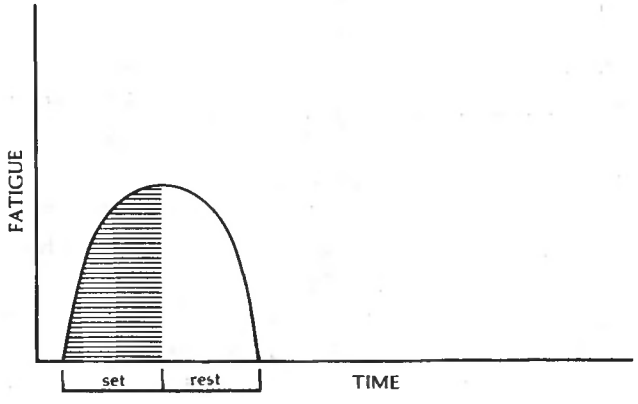


Fig. 3-1 Fatigue Level During 1 Set

A series of sets, with long rests in between, has a fatigue curve that looks like this:

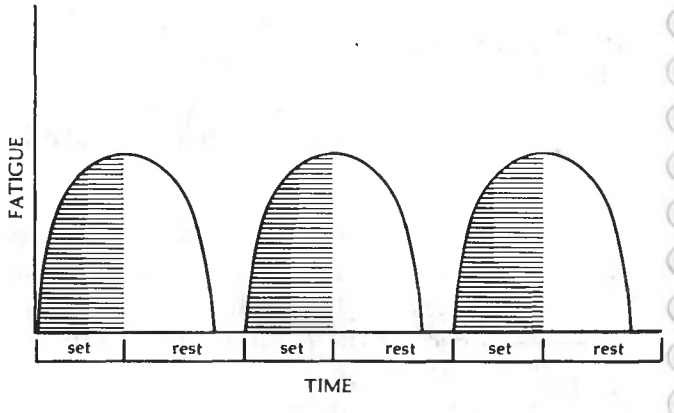


Fig. 3-2 Fatigue Level During 3 Sets; Long Rests

Notice that as a result of letting the muscle's fatigue level drop so low in between sets, it doesn't get more tired during the second set than during the first, nor more tired during the third than during the first.

Even when you figure in the tension factor, the basic shape of this curve looks the same. The bottom line: no cumulative fatigue effect.

Now, previously, we said a muscle's Fatigue/Tension level must surpass a particular **threshold** for muscle growth to occur. The graph below illustrates why long rests impair progress. Simply—you never cross the threshold.

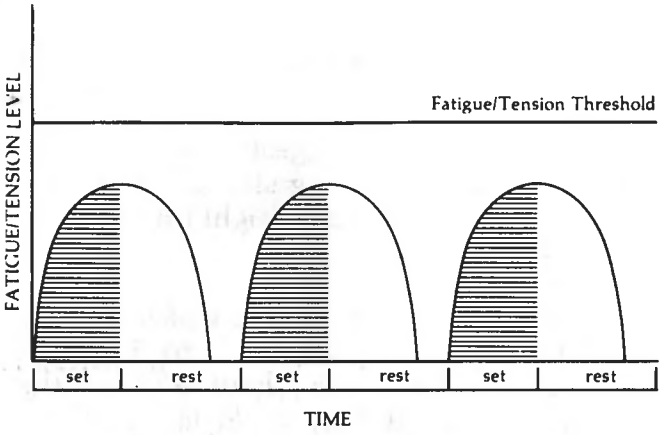


Fig. 3-3 The Fatigue/Tension Threshold

As you shorten the rest time between sets, though, the muscle's fatigue level doesn't have time to drop as far, and you get a stair-step Fatigue/Tension curve that looks like this:

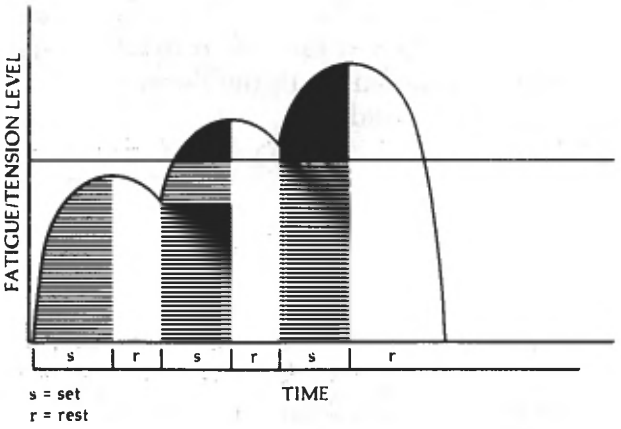


Fig. 3-4 Fatigue/Tension During 3 Sets; Short Rests

Now the muscle does get more tired during the second set than during the first. And during the third set you finally surpass the Fatigue/Tension Threshold. Presto!—*growth*. This is why shorter rests between sets facilitate increases in size and strength.

The same principle applies to rests *between exercises* for the same body part. After doing three or four sets of an exercise, the muscle(s) affected will show some cumulative fatigue level, assuming you are working fast and hard enough. If you rest too long before beginning the next exercise for that same muscle group, the group's fatigue level will drop enough to prevent a cumulative fatigue effect across the different exercises:

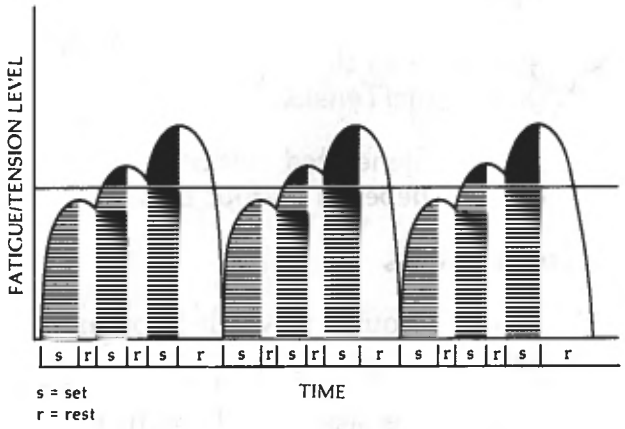


Fig. 3-5 Fatigue/Tension Level During 3 Exercises; Short Rest Between Sets; Long Rest Between Exercises

"So what?" you may say. "If I've crossed the F/T Threshold during the first exercise for a muscle group, does it really matter that my fatigue level drops before the next?"

Yes! Crossing the F/T Threshold is just the beginning of the growth process. Crossing the Threshold, and **staying above it**, is what promotes greater development in less time.

And that's why overall workout speed is important, not just the length of rests between sets or the rep rate. (Also, it's possible you may not cross the F/T Threshold until the second or third exercise for a body part, and may do so then only if you are working fast enough.)

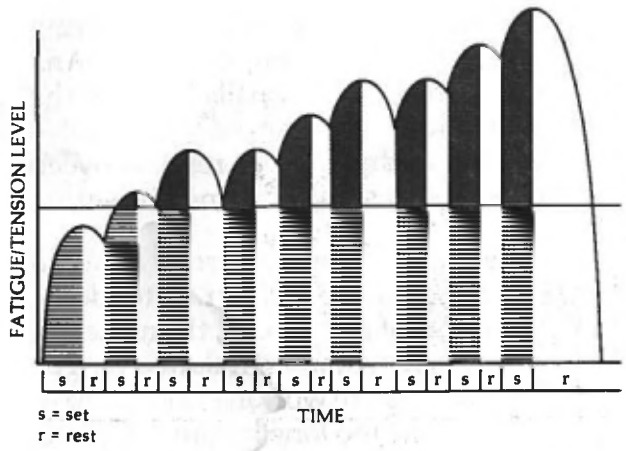


Fig. 3-6 Fatigue/Tension Level During 3 Exercises; Short Rests Between Sets; Short Rests Between Exercises

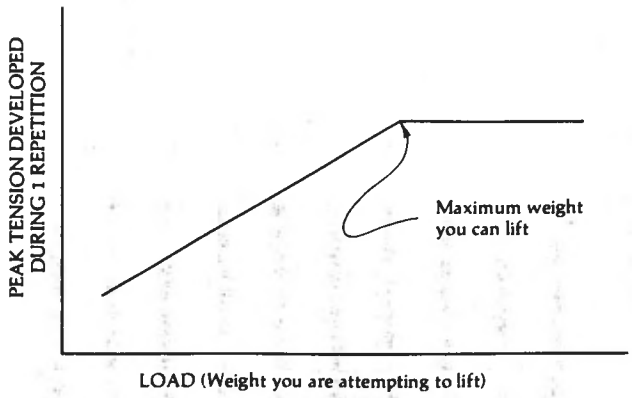


Fig. 3-7 Peak Tension vs. Load

Tension

Now let's turn to the question of tension within the Fatigue/Tension concept.

The tension generated within a muscle during exercise depends on four things:

- exercise **form,**
- the **load** (amount of weight) you are lifting,
- the **leverage** associated with the exercise movement,
- and the **mental focus**—the oomph!—you put into your effort.

We covered *form* in the previous section. For simplicity's sake, let's assume you are going to put an all-out effort into every rep you do; this will keep mental focus constant. So let's take a look at *load* and *leverage*.

Load

The relationship here is simple: greater load (more weight), more tension...up to a point. As the weight approaches the maximum you can lift, tension within the muscle levels off:

Now, experience suggests heavy weights are required for building strength and bulk. But as we've mentioned, weight isn't the only factor involved.

Studies have been done in which a group of athletes/bodybuilders did 3 to 5 sets of various exercises with about 80% of the maximum weight they could lift. Each set consisted of one all-out rep followed by five minutes of rest, then another rep and another rest, and so on until each test subject had performed ten reps total. The athletes followed the regime three times per week for several months. Then everyone was tested for changes in strength and bulk. The results? Practically no gains! Only a small percentage showed any signs of improvement.

The reason this approach failed is clear in light of the Fatigue/Tension Principle: even with high tension, low fatigue from long rests held the combined Fatigue/Tension level below the Threshold.†

†It is possible to generate a tension level sufficient to compensate for the low fatigue from long rests. This requires using 95% to 100% of the maximum weight you can lift. Power lifters use this sort of workout. We do not recommend this, for two reasons: (1) it puts potentially injurious stress on joints and ligaments; (2) it is not the most effective training program for the combined goals of strength, bulk, and definition.

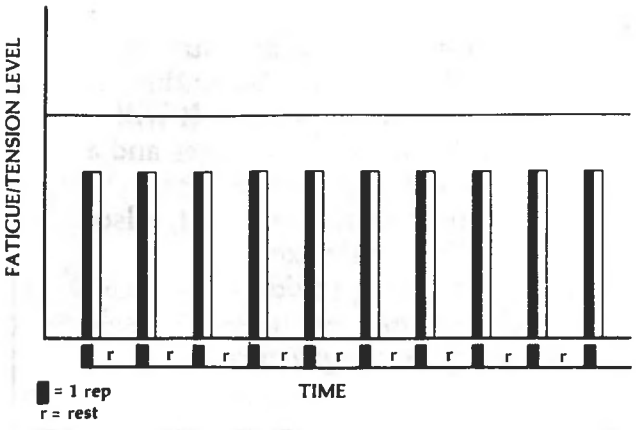


Fig. 3-8 10 Single Reps; 5 Minute Rests

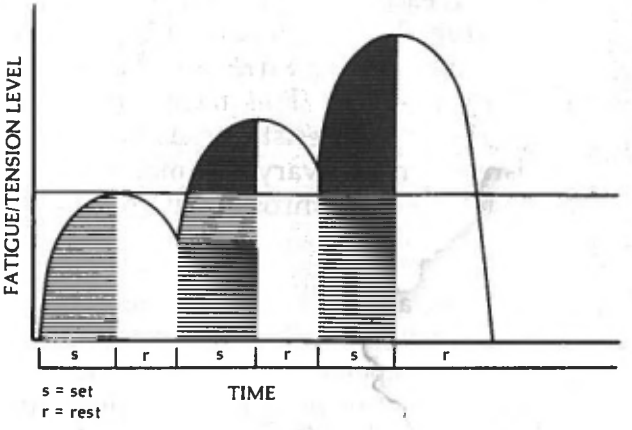


Fig. 3-10 Fatigue/Tension Level; Heavy Weight

This is not to say a high load is an unimportant component in the growth-inducing formula. Quite the contrary. Using near-maximal poundages has a pronounced effect on a muscle's Fatigue/Tension level. It's just that you must structure your workout to maximize *fatigue*—fast pace, short rests—as well as the *tension*. In general, using heavier weights raises the entire F/T curve. It also makes the curve peak at a higher level because heavier weights increase fatigue as well as tension!

Here are the curves for the same exercise done at the same pace, first with lighter weights, then with heavier:

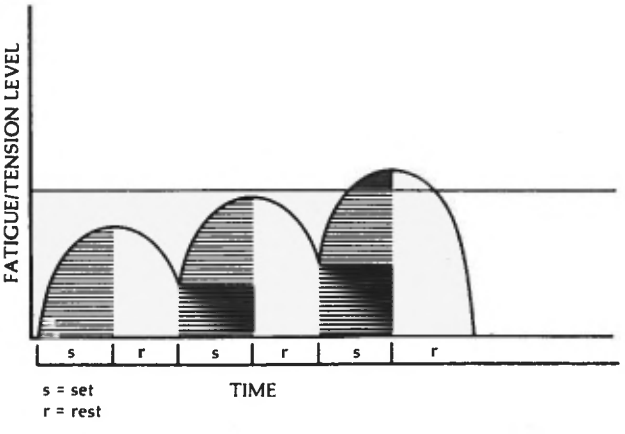


Fig. 3-9 Fatigue/Tension Level; Light Weight

Notice how much steeper the second curve is, and how much sooner it crosses the Fatigue/Tension Threshold.

Leverage

We listed four things that affect the tension generated within a muscle during exercise: form, load, leverage, and mental focus.

Leverage is the most recent of these to be incorporated into workout routines. The last few years have seen the introduction of the "Eccentric Cam" into sophisticated weight training equipment—Nautilus machines, for instance. The Eccentric Cam is an acknowledgement of a fact we discussed earlier—that the strength of a muscle varies across its range of motion.

When doing a bicep curl you have better leverage, and thus more strength, when you are just under halfway through the curl than when your arm is fully extended.

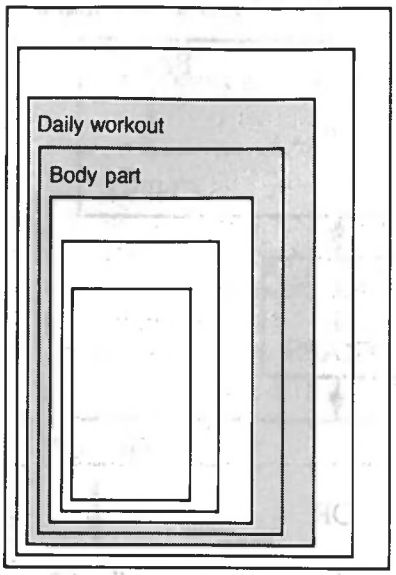
Therefore, it takes more weight to generate the same tension within the muscle when your arm is bent than when it is extended. So a weight heavy enough to provide maximal resistance when your arm is bent is going to be much too heavy when your arm is extended.

Remember, each muscle has its own unique strength curve. A good exercise pits a muscle against resistance that varies in relation to the muscle's strength. This means that for you to *perceive* the resistance as constant, the resistance must vary to match your strength at all points throughout the range of motion.

Through an application of biomechanical principles, it's possible to design exercises that do not involve expensive equipment, but do provide the benefits of variable resistance. This leads to a higher Fatigue/Tension level, and faster growth!

- **An effective routine must be structured to maximize the Fatigue/Tension level. It will involve heavy poundages and a pace and organization that ensure a stair-step effect. Also, it will include exercises adjusted to provide resistance closely matched to each muscle group's strength curve.**

* * *



Factors to Optimize	Operative Principles
■ Number of body parts	■ Maximum gains without Overtraining
■ Body-part sequence ■ Rest length between body parts	■ Interdependency ■ Fatigue/Tension Principle
■ Number of exercises	■ Athlete's experience
■ Exercise selection	■ Functional Strength/Isolation Exercises
■ Exercise sequence	■ Interdependency Principles
■ Rest length between exercises	■ Fatigue/Tension Principle

THE *BODY PART ROUTINE* AND *DAILY WORKOUT*:
EXERCISE SEQUENCE

Discussing the Fatigue/Tension Principle has taken us through two more elements. We started out considering factors that affect the organization of reps within a *set;* we ended by beginning to consider factors that affect the organization of the *daily workout.* Let's continue with that element now, with another important principle...

THE INTERDEPENDENCY OF MUSCLE GROUPS

Research has demonstrated there is one particular sequence of a given series of exercises that affords maximum benefit to all muscles involved. This sequence makes each of the exercises more effective than those same exercises performed in random order. This optimal sequence is largely determined by a principle called "The Interdependency of Muscle Groups."

The Interdependency Principle states that since the body works as an integrated whole, it is impossible to activate one muscle without involving others. In other words, individual muscles never act alone.

The muscle or muscle group primarily responsible for a movement is called **the prime mover**. Muscles assisting the prime mover are called **synergists**. Muscles holding the body in position so the prime mover and synergists can act are called **stabilizers.**

When you do a Bench Press, for example, where the pectorals function as prime mover, certain muscles hold your shoulders in place and keep you from rolling off the bench. These include the back muscles, the rear delts, and the abdominals. These muscles are not responsible for lifting the bar, but they are definitely involved in the exercise. (Ask any beginner who has ever gotten a cramp in his or her back with the bar halfway up!) The back muscles, the rear delts, and the abdominals are functioning as **stabilizers**.

Other muscles—your anterior deltoid (front shoulder) and triceps—directly aid the pectorals (prime mover) to press the bar. These muscles are functioning as **synergists**.

PRIME MOVERS are helped by **SYNERGISTS**

while a foundation for movement is provided by

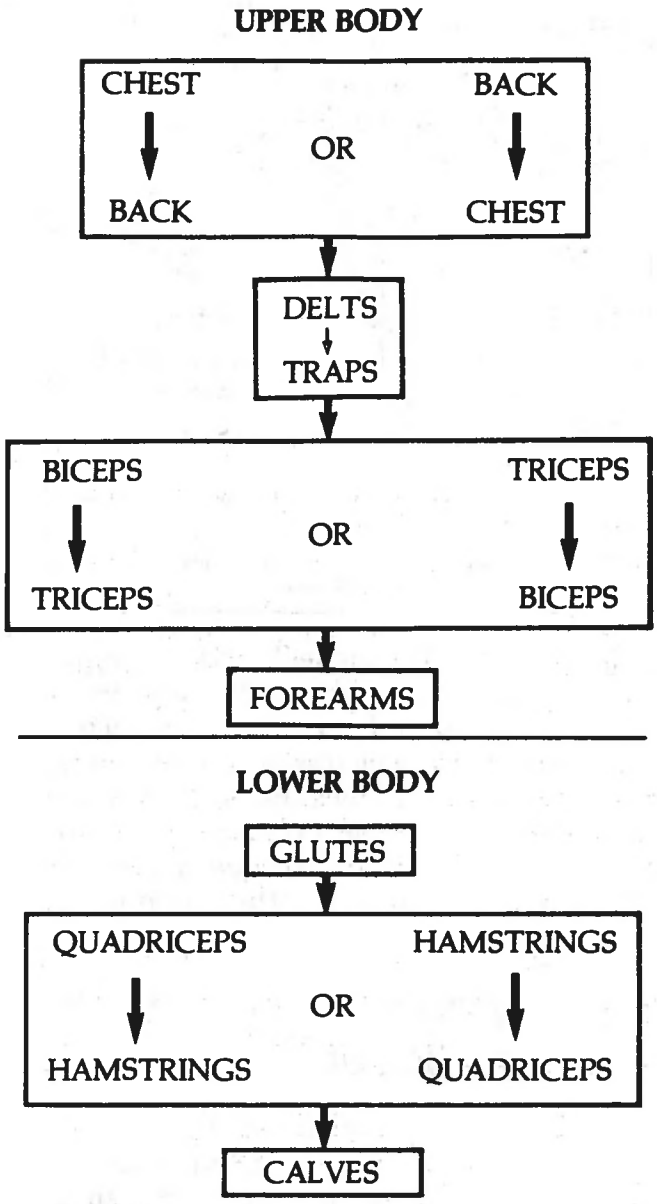
STABILIZERS

Every muscle can act as *prime mover, synergist,* or *stabilizer,* depending on the movement. We said that when you do a Bench Press, the pecs are the prime mover, and the triceps are synergists. But when you do Tricep Press Down, the triceps function as prime mover, and the pecs function as stabilizers.

In determining exercise order, we will mainly be concerned with prime movers and synergists. Here is a list of prime movers and synergists for several upper body parts. Most nearby muscles that are neither synergist nor prime mover are acting as stabilizers.†

The interdependency of prime movers and synergists leads to an important concept. **As a general rule, if a muscle is going to be called on to function as a synergist at some point in your workout, you shouldn't work it as prime mover first.** If you do, the muscle, tired from working as prime mover, makes an ineffective synergist. For example, you wouldn't want to work triceps before pecs, because tired triceps would severely limit your efforts in the bench press.

This is the rationale behind the tried-and-true rule of working from the **center of the body outward.**



BODY PART	SAMPLE EXERCISES	PRIME MOVER	SYNERGIST(S)
Upper Back	Pull-Downs, Rows	Lats, Middle and Lower Traps	Biceps
Chest	Supine, Incline, and Decline Bench Press	Pectorals	Triceps and Anterior Deltoid (front shoulder)
Shoulders	Military Press Upright Rows	Deltoids	Triceps Upper Trapezius

†Those of you up on your kineseology may have noticed we left out *the antagonists.* We'll get to the concept of opposing muscle group pairs shortly.

Forearms should always be worked last, for two reasons:

- They are involved in almost all upper body weight training exercises, so you run the risk of dropping barbells (perhaps in the middle of a bench press!) if you tire your forearms first.
- The heavy weight often used for Bench Press and most kinds of Rows is sufficient to injure wrists destabilized by tired forearm muscles.

Notice synergists become prime movers later in your routine. This yields another benefit. These muscles, now acting as prime movers, are already fatigued from functioning as synergists, so they don't need to be pushed as hard to get a good workout. Result: greater gains with less effort!

Although the "Work from Center of the Body Outward" concept is a well-known application of the Interdependency Principle, there are other applications less well-known, yet equally powerful.

We will use four of these applications in structuring the routines listed in the Program Section: *working muscle **segment** as synergist before working muscle **segment** as prime mover, supersetting two exercises for the same prime mover that employ different synergists, pre-exhausting, and doing back-to-back exercises where synergist or stabilizer immediately becomes prime mover.*

Interdependency Application # 1

WORKING MUSCLE SEGMENT AS SYNERGIST
—BEFORE—
WORKING MUSCLE SEGMENT AS PRIME MOVER

This is the Interdependency Principle applied to muscle *segments*, like upper and middle pecs, instead of muscle *groups*, like chest and triceps.

The upper and middle pecs are interdependent in this way:

To work **upper pecs,** you only need to use

UPPER PECS

To work the **middle pecs,** you need to use

MIDDLE PECS *AND* UPPER and LOWER PECS

In other words, the upper and lower pecs function as synergists when middle pecs are functioning as prime mover.

Remember the rule: If a muscle segment is going to be called on to function as synergist, avoid working it as prime mover first. You would be breaking the rule if you worked upper or lower pecs before middle pecs. And as a result, upper or lower pec fatigue would limit middle pec work.

The Interdependency Principle calls for exercising middle pecs first. That way you can exhaust the middles completely, and then work the uppers and lowers to their limit with exercises concentrating on them. And you receive a bonus: the upper and lower pecs, fatigued from functioning as synergists, don't need to be pushed as hard to get a good workout!

The Interdependency Principle should be used when structuring the routine for each bodypart. It guarantees greater gains with less work by making each exercise enhance the effectiveness of every other exercise.

Interdependency Application # 2

COMPOUND SET: DIFFERENT SYNERGISTS, SAME PRIME MOVER

This involves performing, back-to-back and without rest, exercises that employ different synergists but work the same prime mover.

For example, when working your delts, begin with Military Press, where the synergist is the *triceps*, and then immediately (no rest!) do a set of Upright Rows, where the synergist is the *trapezius*. This combination will give you a better burn than most other complete delt routines, even those containing five or six exercises.

Interdependency Application # 3

PRE-EXHAUSTION

As mentioned above, any muscle can act as prime mover, synergist, or stabilizer, depending on the movement. Tiring the prime mover is the goal of any exercise.

In certain exercises employing synergists, the synergists have *more* endurance than the prime mover. When performing these exercises, the prime mover tires first, accomplishing the goal.

In other exercises, though, the synergists have *less* endurance than the prime mover. That creates a problem. When performing these exercises, the synergists tire first, and the prime mover doesn't get a good workout.

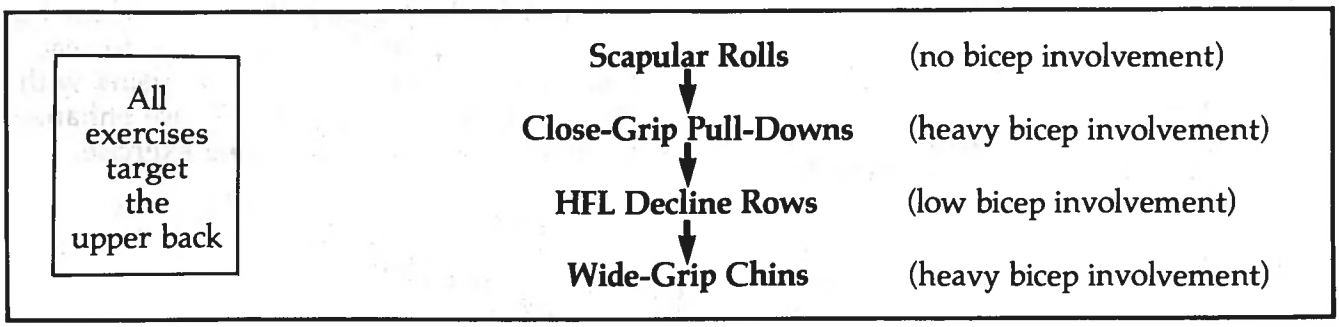
The solution? Start by doing exercises that tire the prime mover without tiring the synergists. Then do the synergist-dependent exercise. As a result of **pre-exhausting** like this, you once again have the ideal situation: the prime mover, not the synergists, becomes the limiting factor in the exercise.

Example:

When doing Close-Grip Pull-Downs, the biceps (synergists) often have less endurance than the upper back (prime mover). You get around this limitation by pre-exhausting the upper back with the Scapular Rolls exercise, described on page 37. Scapular Rolls works the upper back without relying on the biceps. Then when you do Close-Grip Pull-Downs, the upper back is already tired; performance is limited by the upper back, not biceps. Result: a good workout for the upper back.

You also apply the same principle to sequencing a **group** of exercises. Each exercise for a body part tires the prime mover. Some exercises also tire the synergists. If you alternate exercises that tire the synergists with those that don't, the prime mover gets progressively more tired while the synergists have a chance to recover.

Example:



Notice Wide-Grip Chins are at the very end. This exercise, notorious for being limited by the strength of the biceps and for being only moderately effective for inducing lat growth, becomes extremely effective—and is not limited by the biceps—due to its location in the sequence.

Interdependency Application # 4

SYNERGIST OR STABILIZER BECOMES PRIME MOVER

This final application involves sequencing your routine so the synergists or stabilizers from one exercise become the prime movers in the next—for example, doing Hamstring Curls, where the main stabilizer is the *spinal erectors*, and then immediately doing a set of Hyperextensions, where the prime mover is the *spinal erectors*.

- **Based on the Interdependency of Muscle Groups, we can increase the effectiveness of exercise sequence by:**
  - **Never working a muscle as prime mover before that muscle is called on to work as synergist. (The Interdependency Principle)**
  - **Doing Compound Sets; same prime mover, different synergists**
  - **Pre-exhausting**
  - **Sequencing exercises so a muscle that functioning as synergist or stabilizer in one exercise is forced to function as prime mover in the next.**

FUNCTIONAL STRENGTH AND ISOLATION

There are many exercises for each body part. Some rely heavily on synergists and stabilizers. Most of these are "major body motion" exercises like Bench Press, Seated Rows, and Squats. Others rely only moderately on synergists and stabilizers. These are more focused exercises like Pectoral Flys, Tricep Kick-Backs, and Leg Extensions.

Major body motion exercises duplicate the ways you use muscles in everyday life.

Think about it—when was the last time you did a motion resembling a Tricep Kick-Back outside of the gym? In contrast, everytime you push open a door, or help a neighbor move a couch or refrigerator, what you are doing looks a whole lot like a Bench Press. Everytime you lift a heavy box from the floor, the motion resembles a Squat. And if you have to put that box on a top shelf, you are essentially doing a Military Press.

The kind of **functional strength** resulting from major body exercises is much more important in terms of health and effectiveness in day-to-day physical activity than the limited, specific strength resulting from isolation exercises.

This doesn't mean isolation exercises are "bad." Quite the contrary. Isolation is a powerful tool for maximizing the development of specific muscle groups or segments of specific muscle groups. What it does mean is you should never construct a routine consisting *solely* of isolation exercises.

A balanced workout includes both major body motion—"functional strength"—exercises, and isolation exercises.

However, **Functional Strength Exercises (FSEs) should precede isolation exercises.** Here's why:

FSEs are most effective when performed with heavy weights—and in the interest of safety, it's better to do heavy exercises before you tire the synergists and stabilizers for a body part. Doing FSEs with heavy weights maximizes the involved muscles' Fatigue/Tension level, tires the prime mover sufficiently for later isolation exercises to have an effect, and puts sufficient stress on the ligaments to strengthen them.

That last point is very important. Only a *substantial* overload—like the kind you get performing FSEs with heavy weight—puts sufficient stress on your musculo-skeletal system to strengthen ligaments and thicken bones.

After the functional strength exercise, you will do several other exercises arranged to *isolate* different parts of the prime mover.

Isolation means focusing stress on an individual muscle or muscle segment. Ask most people, and they will tell you isolating calls for a specific kind of exercise—usually the kind where only one joint is active—for example, Delt Flys (just shoulder) or Tricep Kick-Backs (just elbow). Indeed, isolation exercises of this sort are effective, and we will be using them in our routines. But they represent a limited approach. Much more important is achieving isolation through exercise sequence. Any exercise can be an effective isolation exercise depending on where it is placed in a routine.

Look back at the section on Pre-exhaustion (page 24). The arrangement of upper back exercises in the example at the bottom of the page turns Lat—Pull Downs, usually an ineffective functional strength exercise, into a good isolation exercise for certain muscle fibers in the teres and lats.

The fibers that take the strain here normally wouldn't even get worked. That's because while the lats and teres are fresh, certain fibers always assume the load. Exercise Physiologists call these the "first to be recruited fibers." Since the series of exercises preceding the Pull-Downs has exhausted these first-to-be-recruited fibers, others that normally wouldn't be involved are forced to pinch hit. As a result of exercise sequence, you have effectively isolated and worked a part of a muscle that would otherwise have gone untrained!

- **Major body motion exercises most closely match the ways you use interdependent muscles in everyday life.**
- **Except where pre-exhaustion is required, major body motion exercises— which we will call *functional strength exercises*— should precede isolation exercises.**

- **Isolation can be achieved via specific exercises (usually involving only one joint action) *or via exercise sequence.***
- **Exercises should be sequenced to provide progressively greater degrees of isolation, and to isolate different sections of the prime mover.**

Developing functional strength is an important part of training *for health*, as well as for phenomenal gains.

These are not mutually exclusive goals. In fact, except in the case of certain extreme training choices (like whether or not to take steroids, which, by the way, we recommend against), the very techniques indicated for optimizing long term health are the most effective for maximizing gains.

For example, in the interests of developing functional strength, we encourage you to begin your work for each body part with a major body motion exercise. Research has shown that including such exercises in your routine stimulates growth *throughout the body*, not just in the part being worked. Functional strength exercises are synergistic—do them, and your entire workout becomes more effective!

Two other techniques will contribute to the development of functional strength, and to the effectiveness of the routines we suggest.

Functional Strength Principle # 1

BALANCED DEVELOPMENT AROUND JOINTS

At each joint, muscle groups work against one another in pairs to provide stability, much like guy-wires on opposite sides of a tent pole.

Most day-to-day movements involve these muscle pairs working together. When you rock a heavy piece of furniture back and forth to move it, you are using several of these pairings: at the elbow, triceps to push, biceps to pull; at the shoulder, anterior deltoid and pecs to push, posterior deltoid and lats to pull; and at the waist, abdominals and spinal erectors working against one another to stabilize the body.

Balanced development requires devoting **equal effort** to developing these opposing muscle groups. Only with a balanced approach will you achieve true functional strength—**and** a massive, symmetrically-developed body.

Functional Strength Principle # 2

TRAIN FROM THE GROUND UP

This principle also works to promote functional strength and acts in conjunction with our existing rule of training from the center of the body outward (based on the Interdependency of Muscle Groups). It mostly affects beginners who work their entire body each workout. The principle: **train from the ground up** (legs before upper body).

The reason for this is simple. You should do the most important exercises first, **and well-developed legs do more for your overall health than well-developed biceps.**

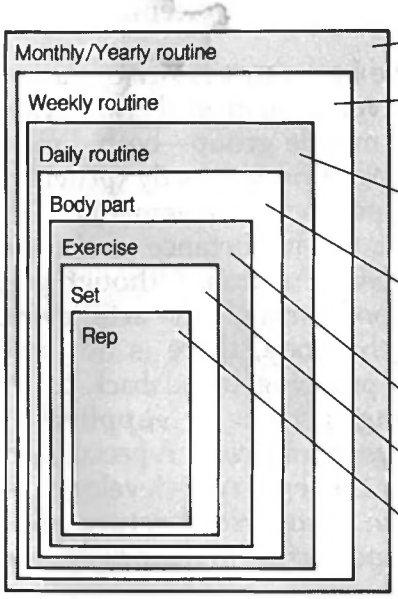
Legs are more important for two reasons. First, they are involved in more daily activities than any other muscle group—both directly (running, walking), and indirectly (providing stability for upper body movements). The second reason is the importance of the role they play in blood circulation. Although your heart pumps blood through the arteries out to the rest of the body, there is no organ responsible for pumping blood back to the heart; pumping action is supplied by movement of your muscles, especially the large muscles in the legs. Well-developed leg muscles result in better blood return and a healthier, more powerful circulatory system.

Remember, though, it's not a case of "health" over "results." In fact, the same research that showed functional strength exercises stimulate growth throughout the body demonstrated that the functional strength exercises most effective in this regard are...leg exercises!

- **Work for balanced development around joints (equal emphasis on developing both muscles in each muscle group pair: biceps/triceps, chest/back, quadriceps/hamstrings, abdominal/spinal erectors, etc.)**
- **When working the entire body in each workout, train from the ground up.**

TECHNIQUE AT A GLANCE

We've covered a lot of ground in the past 27 pages, so let's review the most important points. First, remember that to create the ultimate program, you must optimize each element workout *wholon*:



Factors to Optimize	Operative Principles
▪ Number of workouts ▪ Intensity of workouts	▪ Maximum gains without Overtraining
▪ Number of days ▪ Workout sequence (which body parts, which days)	▪ Whole body vs Split training ▪ Interdependency Principle
▪ Rest length between workouts	▪ Maximum gains without Overtraining
▪ Number of body parts ▪ Body-part sequence ▪ Rest length between body parts	▪ Maximum gains without Overtraining ▪ Interdependency Principles ▪ Fatigue/Tension Principle
▪ Number of exercises ▪ Exercise selection ▪ Exercise sequence ▪ Rest length between exercises	▪ Athlete's experience ▪ Functional Strength/Isolation Exercises ▪ Interdependency Principles ▪ Fatigue/Tension Principle
▪ Number of sets ▪ Rest length between sets	▪ Athlete's experience ▪ Fatigue/Tension Principle
▪ Number of reps ▪ Rep speed	▪ Fatigue/Tension Principle ▪ Fatigue/Tension Principle
▪ Form	▪ Line of Force, Plane of Motion Levers & Resistance
▪ Leverage	▪ Leverage Principles

To accomplish this, you will employ the following guidelines...

LINES OF FORCE

- Select or modify exercises to use **Ideal Orientation**—to exactly align Line of Force with direction of resistance. This will minimize joint stress and wasted energy, and maximize concentration on the target muscle group.

PLANES OF MOTION

(Remember: The Ideal Plane of Motion for an exercise is the plane containing the motion that results from Ideal Orientation.)

- Adjust exercise form so all relevant movement takes place within (or at least parallel to) the Ideal Plane of Motion for that exercise.

Continued...

LEVERAGE

- Efficient *single* exercises pit a muscle against resistance that varies in accordance with the muscle's leverage.
- Effective *combinations* for a particular body part employ exercises with markedly different leverage curves (i.e. Hyperextensions followed by Good-Mornings.)

TIMING AND RESISTANCE

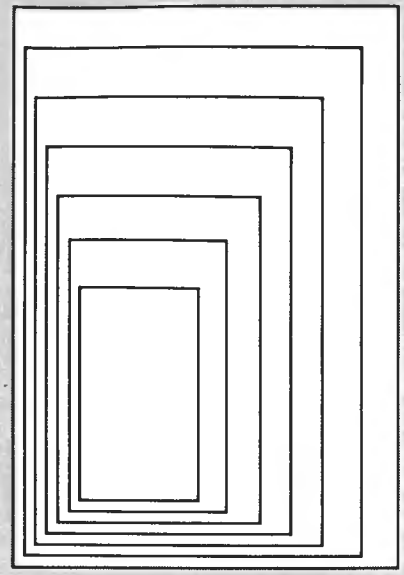
- Employ heavy poundages and a pace and organization that will maximize the Fatigue/Tension level.
  - 6 to 8 reps on upper body exercises; 8 to 10 on lower body exercises
  - reps performed medium speed; no rest between reps
  - maximum 30 second rest between sets of a particular exercise.
  - **no rest** between the last set of one exercise and the first set of the next
  - overall feeling of speed throughout the routine. **No rest** between body parts! Remember the cumulative fatigue effect.

INTERDEPENDENCY OF MUSCLE GROUPS

- Work from the center of the body outward.
- Within a body part, avoid working muscle segments as prime mover before those muscle segments are called on to function as synergists.
- When possible, superset exercises for a prime mover which involve different synergists.
- Pre-exhaust.
- Increase efficiency by going directly from an exercise where a muscle group functions as synergist or stabilizer to one where it functions as prime mover.

FUNCTIONAL STRENGTH

- Except when pre-exhausting, do **functional strength exercises** before isolation exercises.
- Use exercise sequence, as well as standard isolation exercises, to isolate different segments of a prime mover.
- Work for balanced development around joints (equal emphasis on developing both muscles in each muscle group pair: biceps/triceps, chest/back, quadriceps/hamstrings, etc.)
- When working the entire body in each workout, train from the ground up.



THE EXERCISES

Although we still have two elements of the *wholon* to cover—the **weekly** and **monthly/yearly** routines—let's pause here to apply the concepts we have discussed to some actual exercises.

The best way to use the material in this section is to take the course down to the gym with you and read through the exercises one-by-one, trying all the right and wrong ways of doing them. Remember, it's the **details** of performance that make the difference!

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THE UPPER BACK

We mentioned earlier that the first step toward selecting and optimizing exercises for a muscle group is understanding the lines of force associated with that group. You are about to see how this works.

The following chart lists the upper back muscles and their functions.

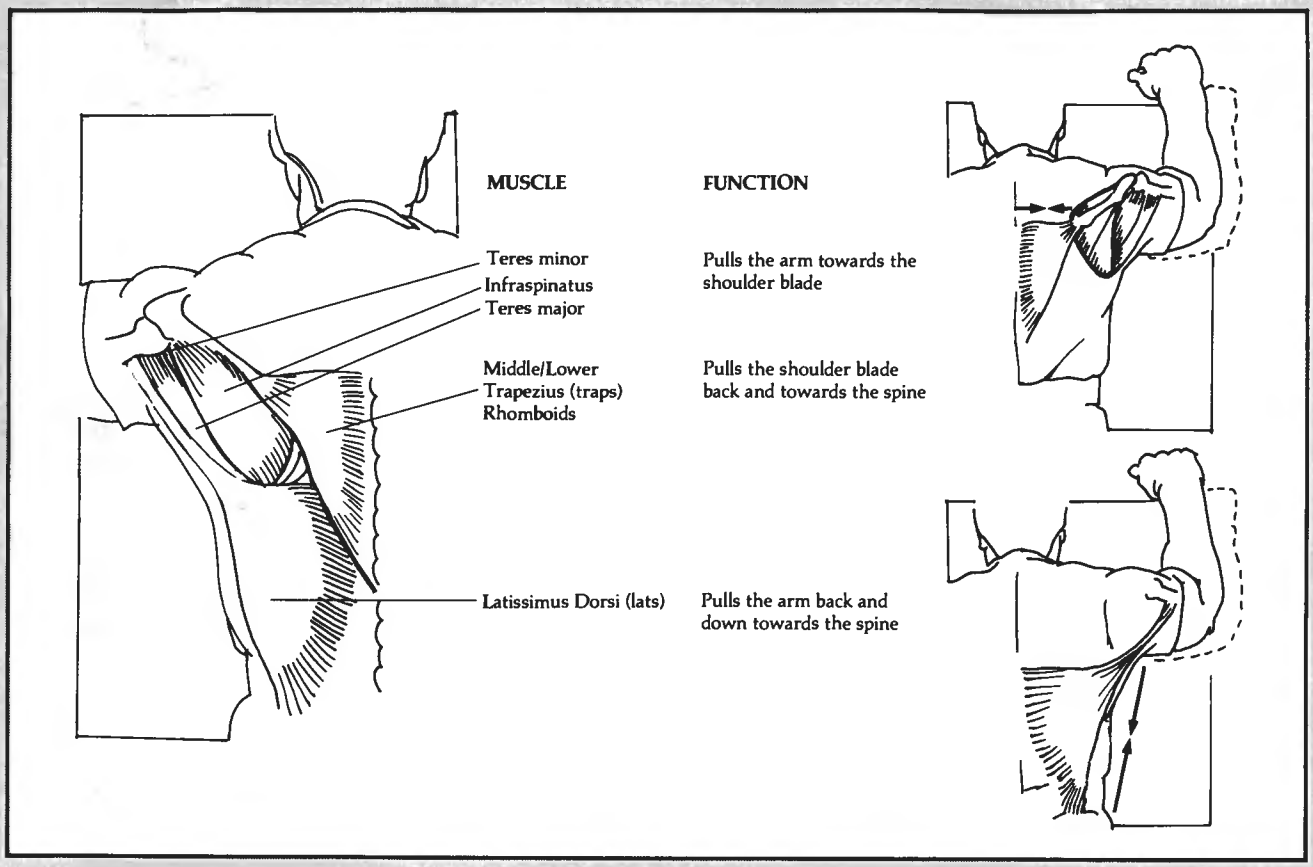


Fig. 5-1

Functionally, all these muscles work together.

The supraspinatus, infraspinatus, teres major, teres minor, and rhomboids are all straight muscles; they contract along only one line. The lats and traps, on the other hand, are fan-shaped muscles and can contract along any of several lines.

The solid arrows in the lats and traps illustrations above show the two outermost lines of force the upper back is capable of generating: one straight across the back, the other nearly straight down.

When working the back, most athletes do exercises stressing only the muscle segments responsible for those two lines of force. The classic example: Bent-Over Rows (straight across) and Lat Pull-Downs (nearly straight down). Each of these lines of force defines a plane of motion, illustrated next page:

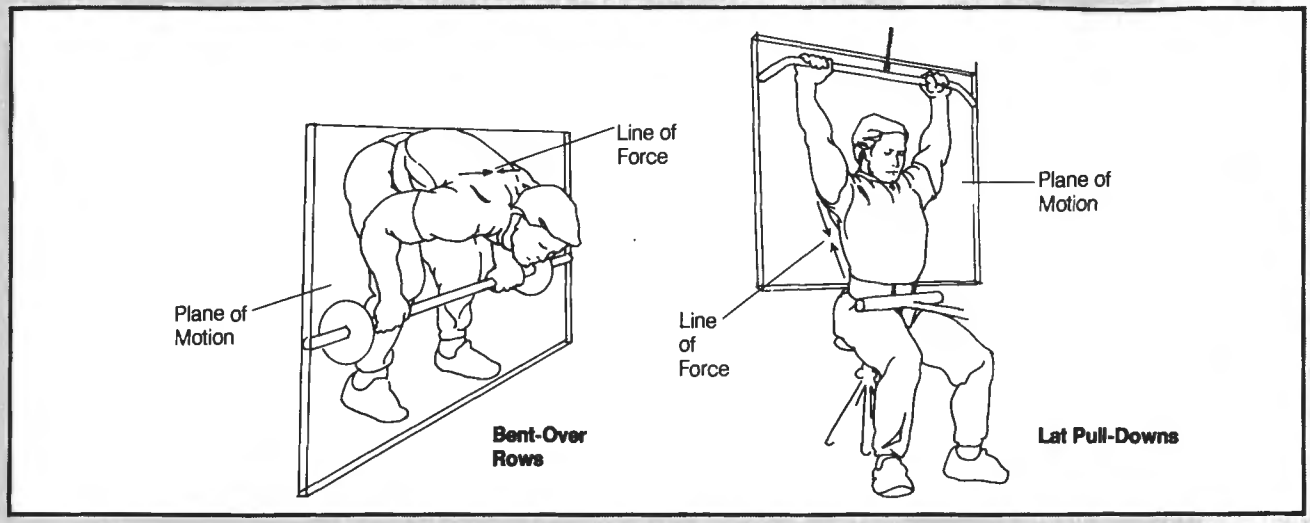


Fig. 5-2

More complicated routines involving other back exercises generally are still restricted to these two lines of force and their corresponding planes of motion. The big problem with this approach is that **it doesn't directly stress the majority of the lat muscle segments, which lie between those responsible for the outermost lines of force!** (Also, the two exercises mentioned are not the most efficient for the outer muscle segments.)

If you had to pick one plane of motion for exercises for the upper back, the best would be:

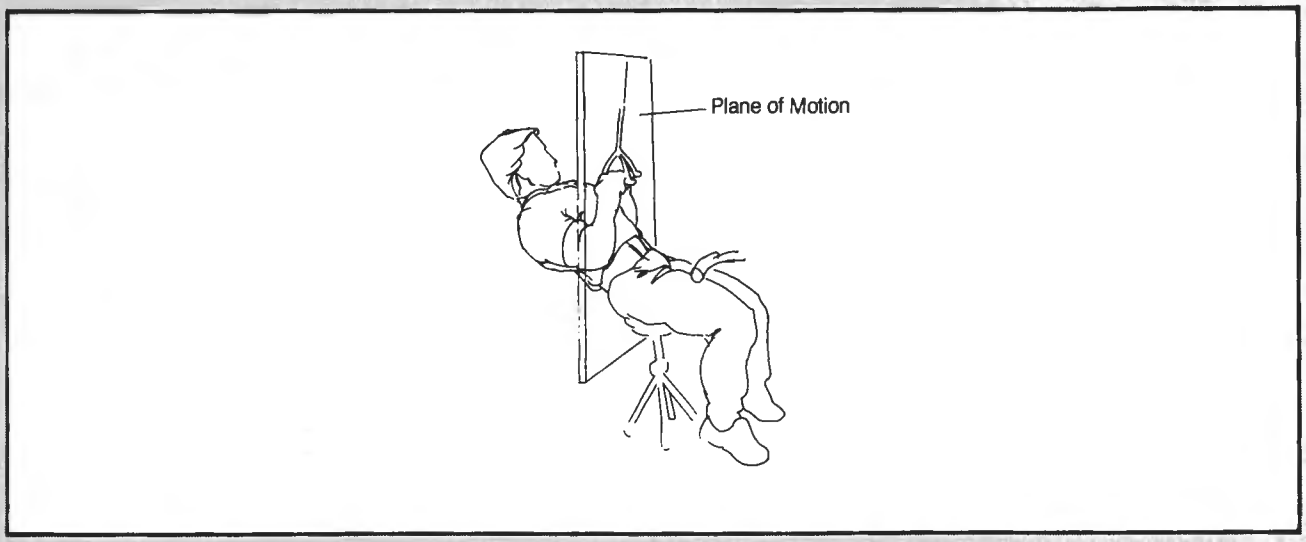


Fig. 5-3

Exercising in this plane directly works the largest section of the lats. In addition, it maximizes the work done by the muscles attached to the scapula—traps, rhomboids, teres major/minor, and infra/supraspinatus. More work, more growth. So it makes more sense to build an upper back routine around exercises like Close-Grip Pull-Downs, which employ this plane, than around the more standard choice, Bent-Over Rows.

CLOSE-GRIP PULL-DOWNS

prime mover: latissimus dorsi, teres major & minor, center & lower trapezius
synergists: biceps, posterior deltoid head

This exercise uses a lat pull-down machine and a close-grip 'V' bar (see Fig. 5-4). When performed correctly, it develops back thickness as well as width because it involves the center and lower trapezius as well as the lats.

Standard Technique

Begin by sitting in front of the lat machine with your lower abdomen all the way up against the restraining bar. (If your gym doesn't have a lat machine with a restraining bar, you can lock a heavy dumbell between your legs, one plate on top, one plate below, to hold yourself down.) Grab the 'V' grip so the narrow end is closest to you.

Pull the bar down until it touches your chest, arching your back and thrusting your chest up to meet the bar. Slowly release. Repeat for 6-8 reps.

Optimized Technique

Begin by sitting in front of the lat machine with your lower abdomen all the way up against the restraining bar. Grab the 'V' grip so the narrow end is closest to you. Lean back *slightly*.

Let your shoulders go so your lats are stretched as much as possible. Certain sections of the muscle only get worked through their full range of motion if you start this way. Doing the exercise the "standard" way, where the starting position involves straight arms but not necessarily extended shoulders, limits the effectiveness of the exercise.

Pull the bar down *to your sternum*—not your upper chest—simultaneously (1) arching your back and thrusting your chest up to meet the bar, (2) leaning further and further back until, by the end of the pull-down movement, you are leaning back at about a 70° angle.

Pulling to your sternum optimizes in terms of the Ideal Orientation.

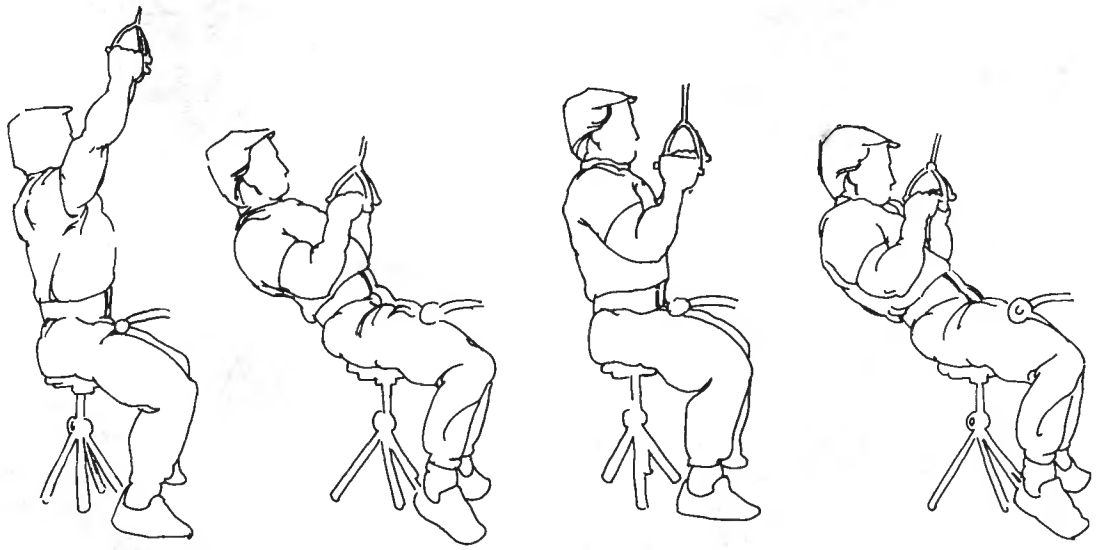
Arching your back and thrusting your chest up to meet the bar assures maximum lat involvement. Don't hunch forward as you pull down. Hunching turns the exercise into a strange "sit-up-like" motion that brings the abdominals into play and increases the contribution of the biceps at the expense of lats. This is a common error.

Finally, leaning farther and farther back **sequentially involves muscle segments across the *entire* fan of the lats.** Yes, this breaks the "common knowledge" understanding of "strict form"—of maintaining a fixed body position during exercise. But in this instance, purposely changing your position is not cheating. It's optimizing in terms of lines of force, and *greatly increases the effectiveness of the exercise.*

If you don't lean back, and instead pull straight down, as illustrated in the "wrong" drawing in Fig. 5-4, you reach a point about 2/3 of the way through where your biceps—not your lats—are doing most of the work. Try it the wrong way. You will notice the exercise beginning to feel like a curl. Doing the exercise correctly provides maximum resistance for the lats throughout their range of motion.

Slowly release. Your body should return to just short of an upright position. Feel for the lat stretch at the top of the motion and make sure you have allowed your shoulders to extend. Repeat for 6-8 reps.

Perhaps most important for this exercise—in fact for all upper back exercises—is discovering the feeling of pulling from your back rather than from your arms. This may sound obvious, but there is an enormous difference between the conventional way of doing the exercise and the way an advanced bodybuilder does it. The Pull-Down should begin with *shoulder movement,* not elbow flexion. That means the shoulders should move back and down, and the shoulder blades should move toward one another *before the elbows begin to bend.* It should feel like the pull is coming from the bottom of your lats.



a. Start b. Finish c. Wrong — too upright e. Wrong — hunched over

Fig. 5-4

Depending on the exact setup at your gym, you may be able to use the alternate starting position illustrated in Fig. 5-5a. This is considerably more secure and virtually guarantees the correct upper body angle during the exercise.

One more advantage— This position can be modified to provide the basis for an exercise which works like the Seated Cable Row (Fig 5-5c). Simply lean back until your torso is at a 90° angle to the cable, and go for it!

Unlike the Seated Row, in which there is considerable—and potentially damaging—pressure on the lower spine, this **Modified Seated Row** actually elongates the spine and provides a healthy stretch for the lats and lower back as well!

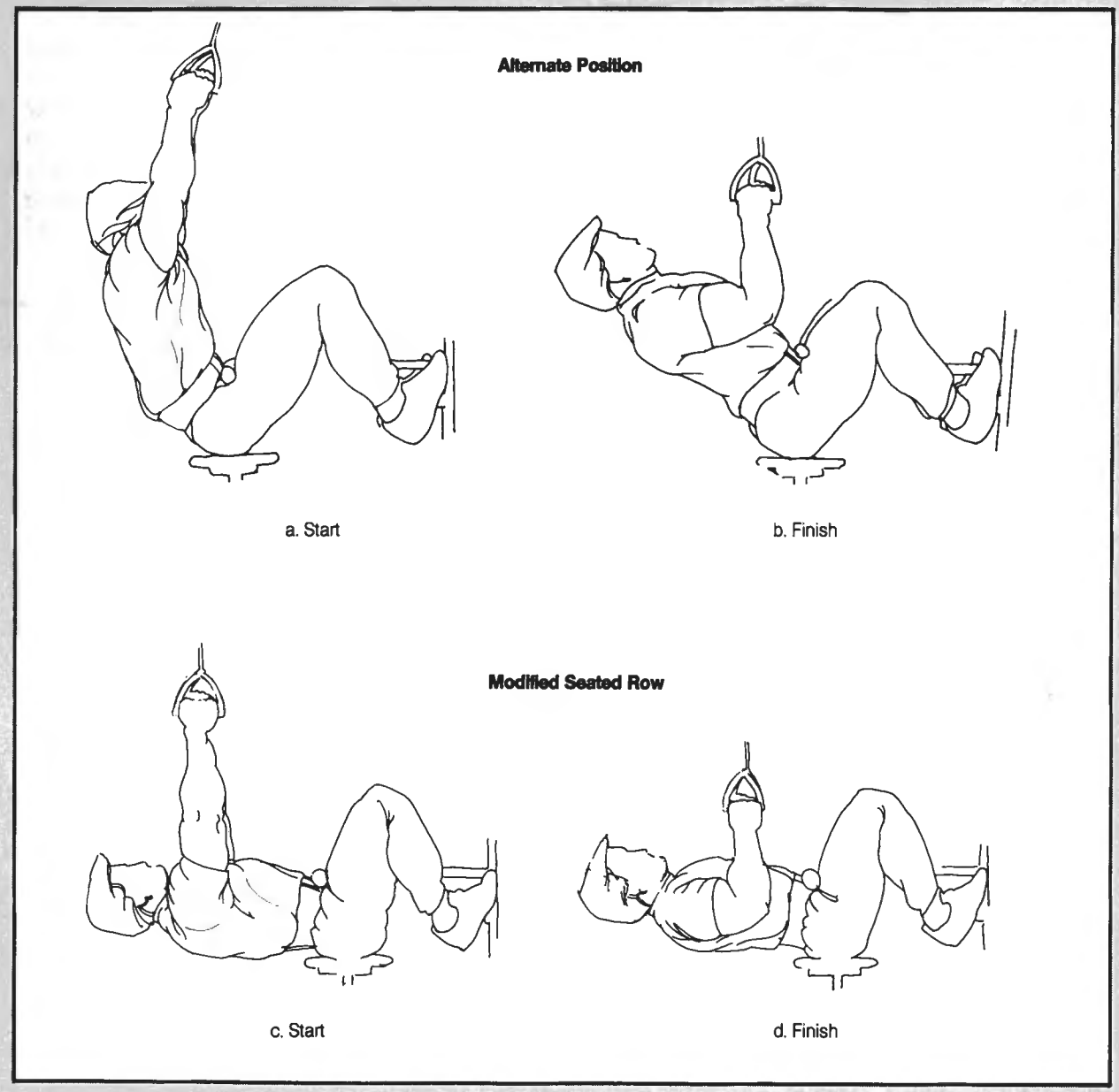


Fig. 5-5

SCAPULAR ROLLS

prime mover: lats, teres major and minor
synergists: traps

Scapular Rolls is a companion exercise to the previous one. It is designed to *pre-exhaust* the lats and teres (prime mover)—to insure that bicep strength isn't the factor that limits your performance of Close-Grip Pull-Downs.

Optimized Technique

The beginning position for this exercise is exactly the same as for Close-Grip Pull-Downs, except you use a straight bar instead of a "V" bar.

Begin sitting in front of a lat machine with your lower abdomen up against the restraining bar. Take a shoulder-width grip on the straight bar, palms facing away from you. Lean back slightly (we're after the same line of force as in the previous exercise). Let your shoulders relax so your lats are stretched as much as possible, and your shoulders are raised as high as possible.

Now, allowing your elbows to bend only slightly, pull down on the bar. Feel for maximum movement of the shoulders and shoulder blades. Keep the following points in mind:

- The only motion should be your shoulders coming down and your shoulder blades getting closer together.
- The path your shoulders follow should look like the letter "J" (see illustration).
- It's O.K. to bend your elbows *slightly*.
- The bar will only move about six to twelve inches.

Hold for a second, then slowly let the bar back up, feeling once again for maximum stretch in the lats. Repeat for 6 to 8 reps.

This one is pretty subtle! Don't get discouraged if it feels awkward at first.

Special Note: Scapular Rolls is *only* intended to be used in combination with a bicep-dependent upper back exercise like Close-Grip Pull-Downs. It is not designed to be used alone.

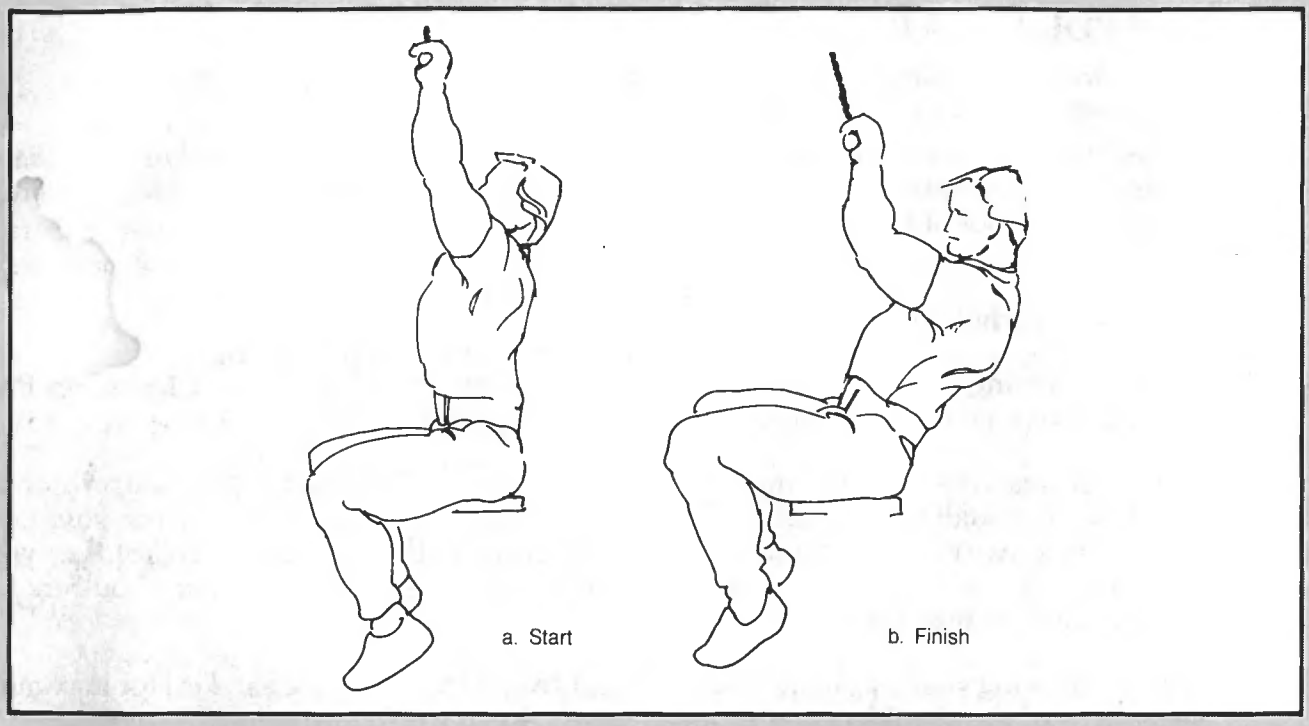


Fig. 5-6

* * *

One of the objectives of this course is to prepare you to evaluate and optimize all the exercises you do, not just the ones discussed. Often, this is just a matter of recognizing that an exercise is similar to one of those explained in this section. **As a general rule, similar exercises require the same optimizing strategy**. The next exercise, Close-Grip Pull-Ups, is a good example.

Close-Grip Pull-Ups is the body weight equivalent of Close-Grip Pull-Downs. Both exercises aim to develop the same muscle groups, and their motions are almost identical.

* * *

CLOSE-GRIP PULL-UPS (also called "V-Bar Pull-Ups")

prime mover: latissimus dorsi, teres major & minor, center & lower trapezius
synergists: biceps, posterior deltoid head

Standard Technique

This exercise requires a pull-up bar and an inverted 'V' handle. Grab the 'V' and pull yourself up, aiming to touch your chest to the bar. Lower slowly and repeat.

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This exercise responds well to use with forced reps. Have your partner stand behind you and give you just enough help to complete the motion *in good form* by pushing up gently with both hands on your mid back.

* * *

Two other exercises that share guidelines are Behind the Neck Pull-ups and Wide-Grip Lat Pull-Downs. Both are useful for developing upper back *width*, as opposed to *thickness*, because they focus on the lats, teres, and infraspinatus and limit trapezius involvement.† However, since both put significant demands on the biceps as well, they must be carefully placed within the back workout routine to be effective. (More on this in the Routines Section.)

* * *

BEHIND THE NECK PULL-UPS

prime mover: lats, teres major and minor
synergists: biceps, some traps

Standard Technique

Take a wide grip on a pull-up bar and pull yourself up until the bar touches the back of your neck. Slowly lower and repeat.

Optimized Technique

Grip width is crucial: Your grip must be wide enough that your forearms are never parallel during the pull-up. A narrow grip turns the pull up into a bicep exercise. A wide grip decreases the bicep component by limiting the action at the elbow during the lift.

Think of your entire arm—forearm and upper arm—as a unit while performing the exercise. The action should feel as if it's occurring at the shoulder, rather than the elbow. Pull your body up *and forward* so your entire body is in front of the bar. Remember our picture of the Ideal Plane of Motion for Lat Pull-Downs (Fig 5-2b). Your entire body should be in this plane. You shouldn't have to hunch over to touch the bar to the back of your neck. This common error takes you out of the Ideal Plane and greatly decreases the effectiveness of the exercise by allowing the pecs to share the load.

†The traps are involved. However, in contrast to rowing exercises in which the traps move through their full range of motion, here, their movement is limited.

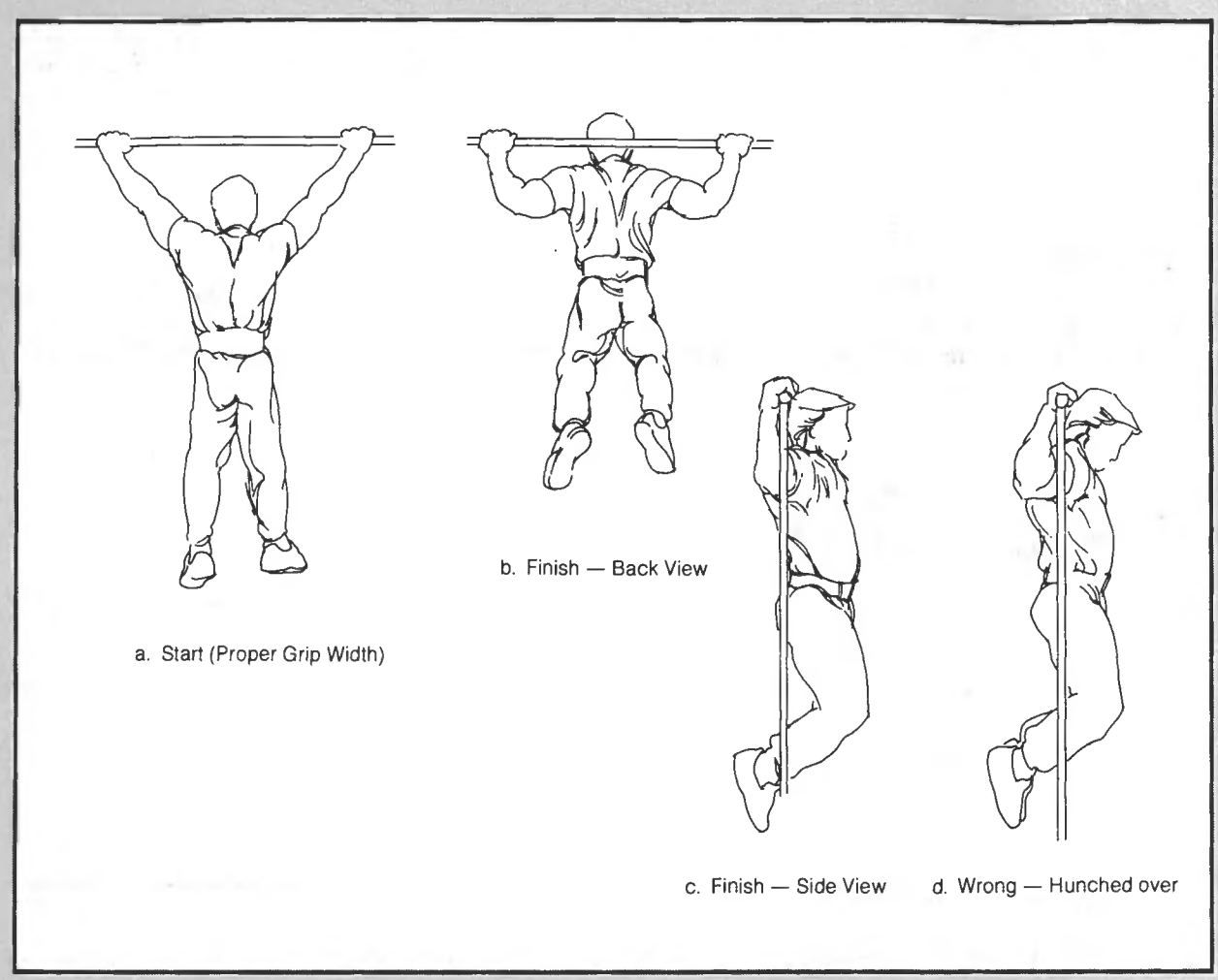


Fig. 5-8

WIDE-GRIP LAT PULL-DOWNS

prime mover: lats
synergists: biceps, deltoid, some traps

Standard Technique

Take a wide grip on a lat pull-down bar and pull down until the bar touches the back of your neck. Release and repeat.

Optimized Technique

This is just like Behind the Neck Pull-Ups. Important points are to pull down, out, and back so your entire body is in front of the bar (follow arrows in Fig. 5-9 below). You shouldn't have to drop your head forward or hunch over to touch the bar to the back of your neck. Also, your grip should be wide enough so your forearms are never parallel during the movement.

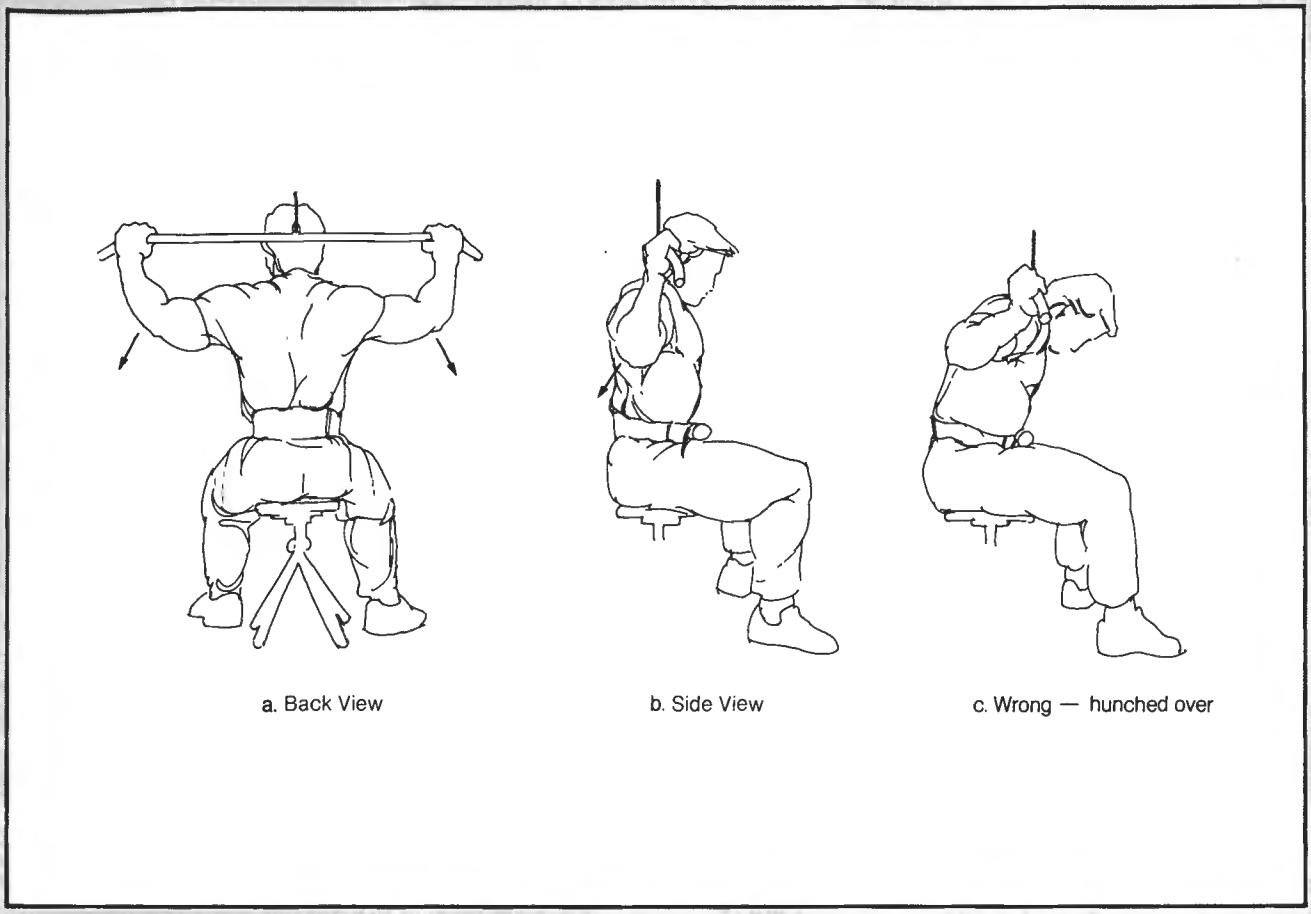


Fig. 5-9

* * *

Most bodybuilders and many athletes whose sports require back strength do at least one, and often a combination, of rowing exercises: T-bar Rows, Bent-over Rows, or Seated-Cable Rows. All of these are effective but all put severe pressure on the lower back, particularly on the lumbo-sacral region. Indeed, a high percentage of athletes who row eventually develop lower back pain due to *prolonged* overstressing of the area. A smaller percentage suffer serious injury that permanently alters the course of their athletic pursuits.

However, the documented high risk of back problems does little to deter use of these exercises. Why? Because they work! Experience dictates that to develop substantial back mass or even just to markedly increase back strength, you must row with heavy weights. And as anybody who takes training seriously knows, it's really easy to overlook potential, long-term problems in the face of substantial, immediate results!

The solution? Incorporate rowing motions into exercises that don't stress the lower back. The Modified "Seated"-Row described at the end of the Close-Grip Pull-Down explanation is one example. Another is the Decline Dumbell Row...

* * *

DECLINE DUMBELL ROWS

prime mover: lats, center and lower traps, teres major and minor, infraspinatus
synergists: rear delts, upper traps

This exercise minimizes the stress on your lower back, allows you to use heavy weights, and will pack a heck of a lot of mass onto your upper back in a very short time!

"Feel" is very important here, so try the exercise with a medium weight first to give your body a chance to understand the movement. Eventually, though, move up to heavy weights. The exercise is most effective when performed with a substantial load: 20 to 45 lbs for intermediate bodybuilders/athletes, 45 to 100 lbs for advanced.

Begin by adjusting an incline bench to a low angle, about 20 to 30°. If your gym doesn't have an adjustable incline bench, use a regular flat bench and put the rear legs up on a block. Make sure the bench is stable before beginning the exercise.

Lean over the high end of the bench so you're supporting yourself on your abdominals.

To start with, the dumbells should be slightly in front of you, one on either side of the bench, rotated back at about a 45° angle (like airplane wings; see illustration). Grip them, palms facing back. Bend your elbows enough so that your shoulder blades travel out as far as they will go. The idea here is to ensure maximum range of motion for your lats and your middle/lower traps.

When you're in the correct position, you will feel a stretch across your middle back as well as in your lats.

Pull the weights up and back (see illustration below), **with the lift coming from your lats and traps, not your arms or shoulders.** Concentrate on starting the movement by bringing your shoulder blades together and away from your head. As you pull, raise your chest *slightly* off the bench, but keep your abdominals firmly pressed against the bench to keep the pressure off your lower back. Rotate your wrists so that your palms end up facing one another. Keep your elbows close to your sides. Lift until your elbows are at waist level.

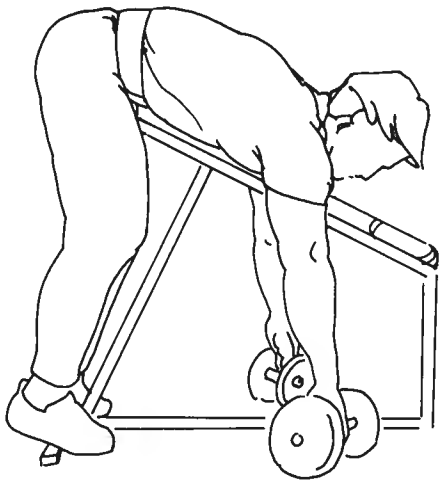
It's important you mentally pull *back* and not just *up*. The combination of starting with the weights in front of you and pulling back activates the lower lats and ensures development of this difficult-to-reach area.

If you feel like you are doing a curl, you're doing the exercise incorrectly. Except for your grip, your forearms and biceps should be as relaxed as possible. Feel for the tension in your lower lats and center back. That's the key.

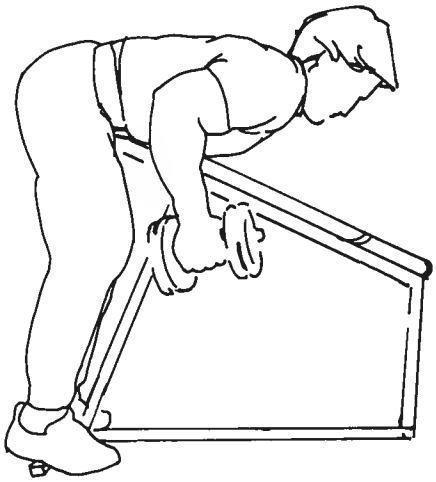
Next step. Reverse the motion to lower the weights. The dumbells should end up not quite as far forward as they started, and not touching the ground. As you lower the weight, rotate your wrists so the dumbells return to their initial 45° angles to the edge of the bench. Keep your elbows bent so you get the maximum stretch across the center back and in the lower lats.

Remember to lean against the bench throughout the exercise to keep the strain off your lower back.

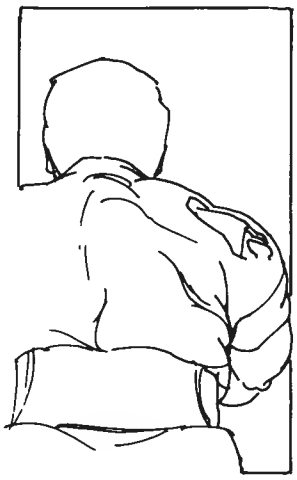
Repeat for 6-8 reps.

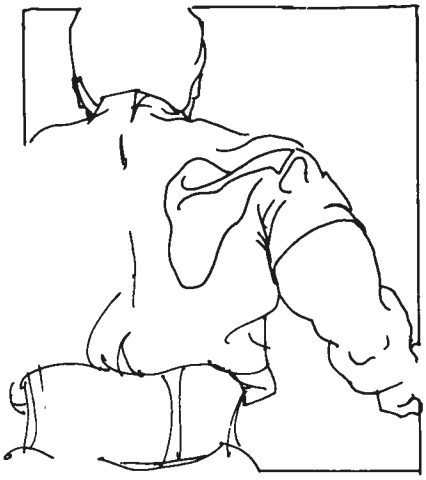


a. Start



b. Finish





Scapula rotate inward and "downward"

c. Backview

Fig. 5-10

ONE-HAND DUMBELL ROWS

prime mover: lats, center and lower traps, teres major and minor, infraspinatus
synergists: rear delts, upper traps

Of the traditional rowing exercises, the One-Handed Row puts the least strain on the lower back. The exercise has two things going for it in this respect: (1) stress is distributed over your legs and one arm—which form a tripod to support the body—rather than being concentrated on the lumbo-sacral (lower back/pelvis) junction, and (2), since this is a dumbell exercise, you use approximately half as much weight.

Standard Technique

Hold a dumbell in your right hand. Stand with your left foot forward, right foot back, knees bent. Bend over until your torso is roughly parallel to the floor. Support yourself by placing your left hand on a bench or chair. Your right arm (your right hand is holding the weight) should be extended straight toward the floor.

Lift the weight straight up toward your shoulder. Hold for a second at the top, then lower slowly. Repeat for 6-8 reps.

Switch hands and repeat the entire set.

Optimized Technique

The two most important factors in any rowing exercise are (1) feeling for the lift to come from the lats and traps, not the shoulders and arms, and (2), getting maximum range of motion out of the exercise—at the bottom of the row, you must feel the stretch in the lats, and the shoulder blades must be out away from the spine as far as possible.

To improve focus and maximize the lat stretch:

Begin the exercise with your feet six inches apart, in-line (neither foot in front of the other). Bend your knees. Support yourself by placing your left hand on a bench or chair. Your right arm (your right hand is holding the weight) should be extended straight toward the floor; the weight should be at a 45° angle to your body (see illustration).

Lift the weight. The dumbell should travel a path next to your right leg, and your palm should end up facing in.

Your *elbow* should end up close to your side, no further back than your hips. This probably directly contradicts everything you've been told about rowing movements and getting your elbows up and back as far as possible, but here is the reason:

Bringing your elbows way back is *supposed* to maximize center trap involvement. The goal makes sense (building center traps makes for a thick, powerful back), but the method doesn't. The function of the center traps is to bring your *shoulders* back and your shoulder blades in toward your spine. Bringing the *elbows* back beyond your hips *may* get you to bring your shoulders back, or it may not. What it definitely will do is increase the involvement of the rear deltoids—and One-Hand Dumbell Rows isn't supposed to be a rear delt exercise.

To maximize the effect of any rowing exercise on the traps, bring your elbow(s) back to your side(s) and then concentrate on bringing your shoulder(s) back and your shoulder blades in toward the spine.

Hold for a second at the top of the move, then lower the weight down **and across your body**, so it ends up in front of your feet. Feel for maximum lat stretch. Repeat for 6 to 8 reps.

Switch hands and repeat the entire set.

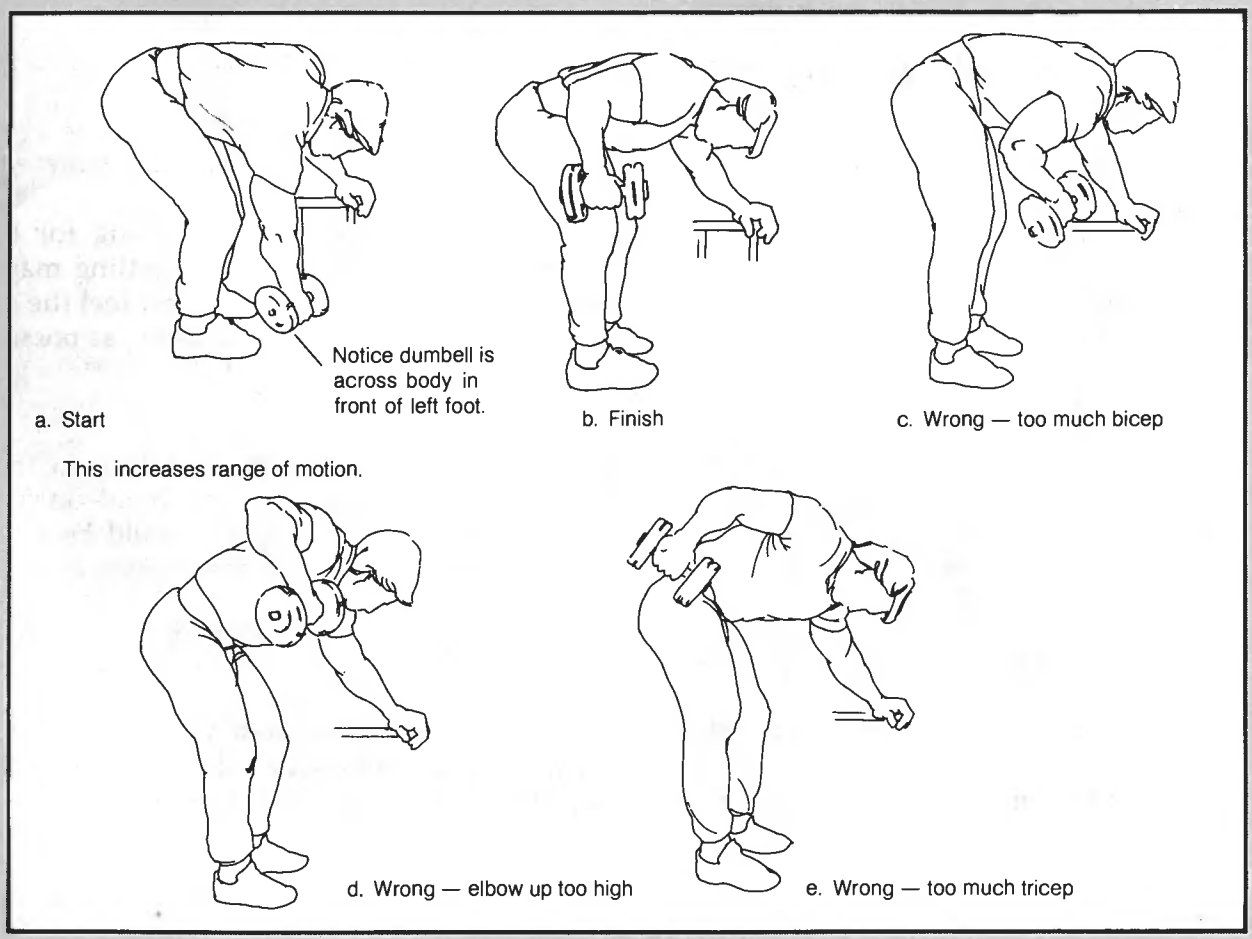

Notice dumbell is across body in front of left foot.
a. Start
b. Finish
c. Wrong — too much bicep
This increases range of motion.
d. Wrong — elbow up too high
e. Wrong — too much tricep

Fig. 5-11

* * *

One of the milestones that marks an athlete's progress is achieving the sense of "locking in" to a particular exercise or athletic endeavor. "Locking in" is characterized by the body suddenly understanding exactly how to perform with greatly improved efficiency. Suddenly everything feels "well greased," and "in the groove." This is the feeling to look for as you train. There is no awkwardness in a locked-in movement. If you feel awkward performing an exercise, experiment and analyze, and adjust your performance until the awkwardness disappears. Your body will learn. You simply have to be open to change.

* * *

SEATED SINGLE-HANDED PULLEY ROWS

prime mover: lower lats, center traps
synergists: rear delts, spinal erectors, obliques, leg extensors

Standard Technique

Sit with legs extended, braced against the Seated Rowing Bar. If your gym doesn't have one of these, consider knocking one together out of two by fours and leaning it up against the base of a low pulley machine. Grab the cable handle with one hand, extend your arm forward. Pull straight back, twisting your body until your elbow is as far back as possible. Slowly release. Repeat 6-8 reps each hand.

Optimized Technique

First off, why do the exercise single-handed and not double-handed, the way it is usually done?

Three reasons: (1) Single-handed Rowing allows the use of lighter weights, decreasing the strain on your lower back and minimizing your risk of injury; (2) Single-handed Rowing allows a greater lat stretch in the "arm extended forward" position, increasing the exercise range of motion and preventing the lats from tightening up; (3) Performed as indicated, single-handed rowing concentrates on the difficult-to-develop lower lat area.

Actually, Single- and Double-Handed Rows are just not in the same category. Double-handed Seated Rowing is a functional strength exercise; it is most effective done with heavy weights early in an upper back routine in the Modified Seated Row position described on page 36. This position eliminates the lower back strain associated with rowing motions. Single-handed Seated Rowing, on the other hand, is most effective when done late in an upper back routine as an isolation exercise. Although it is intended to build mass and strength, it targets a small area of the back (lower lats) and should not be performed with heavy weights!

Here's how to do it:

Sit with legs extended, *knees bent*, feet braced against a Seated Rowing Bar. (If you do this or any seated rowing motion with your legs straight, you increase your chances of injury by introducing the limitations of your hamstring and lower back flexibility into the exercise and increasing the strain on the lumbo-sacral joint {lower back}.)

To start, lean forward, arm straight out in front of you, hand palm down, and shoulder extended as far as possible. As with other lat exercises, feel for maximum stretch across the middle back and in your lats.

Pull back on the handle. Simultaneously:

- rotate your wrist so your palm ends up facing your side
- straighten up your torso and thrust your chest forward; you should *end up leaning **slightly** backward.* (Leaning back too far is a common error that shifts the emphasis of the exercise off the lats and center back and onto the upper traps and spinal erectors.)

Here, as in One-Hand Rows, your *elbow* should end up close to your side at your waist, not farther back. Remember, bringing the elbows farther back increases involvement of the rear deltoids.

Once your elbow is at your side, concentrate on bringing the shoulder back and the shoulder blade in toward the spine.

When you slowly release and allow your arm to go forward, remember to rotate to palm down position and to let your shoulder extend as far forward as possible to maximize the stretch.

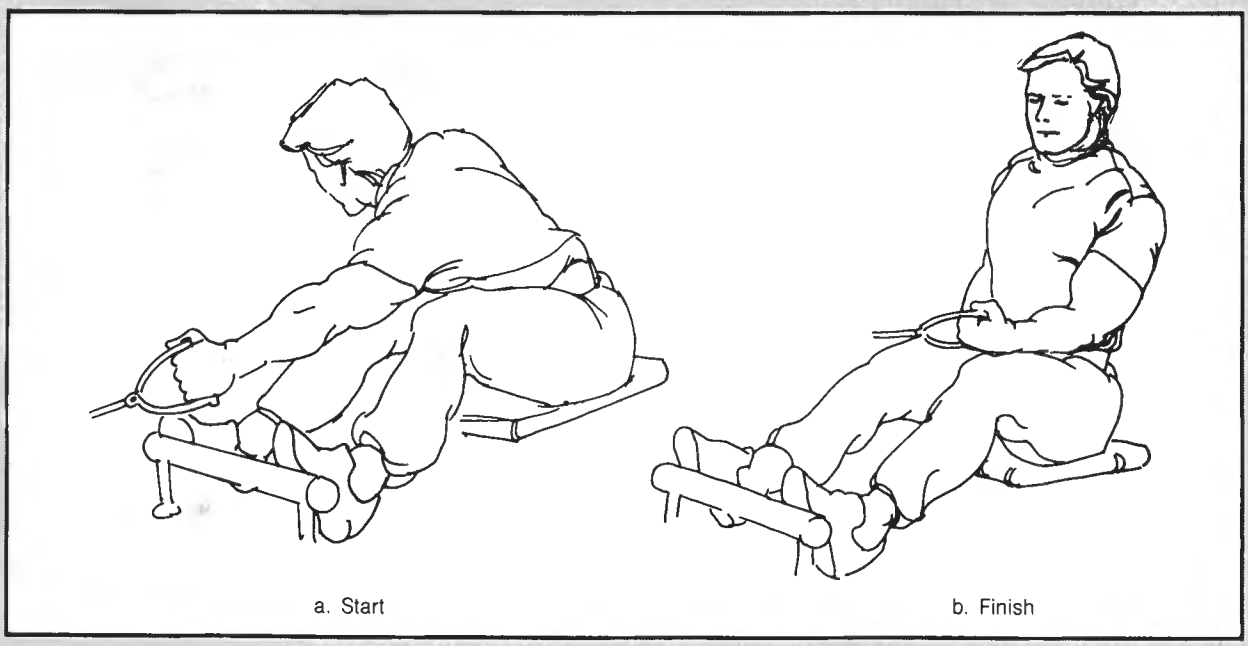


Fig. 5-12

★ ★ ★

Next, we have a body weight lat exercise that looks like Pull-Ups, but there the similarity ends. Twisting Momentum Pull-Ups is one of the most difficult—and most effective—lat exercises we've ever tried. It was developed by Health For Life to solve a problem most serious athletes and bodybuilders face at some point in their careers, namely, that their lats grow so used to hard training, they no longer respond.

Twisting Momentum Pull-Ups is a plateau-breaker. It's also effective for sustaining growth in the advanced stages of training.

★ ★ ★

TWISTING MOMENTUM PULL-UPS

prime mover: lats, teres major & minor, center/lower traps
synergists: biceps

First, a word about what this exercise is **not.** It's not Alternate Close-Grip Pull-Ups. Nor is it really a full Pull-Up of any kind, because you don't go down all the way in between reps.

The important thing in doing this exercise is to develop a kind of momentum, swinging from side to side. This has two effects:

- The momentum varies the resistance against which your back is working in accordance with the back's strength curve. It's sort of like "reverse cheating": When you cheat, you use momentum to make an exercise easier; here, you're using it to make it harder.

- The constantly changing angle of pull makes it almost impossible for your back to "get used" to the exercise. (This exercise, like Modified Close-Grip Pull-Downs, employs changing position to sweep the line of contraction across the fan of lat muscle fibers.)

Twisting Momentum Pull-Ups involves a chinning bar and a 'V' bar attachment. If you don't have access to a 'V' bar, you can still do the exercise by gripping the bar, one hand up against the other, palms facing in opposite directions.

Put the 'V' over the chinning bar and grip it. Pull yourself up, twisting to one side so you end up with your head to one side of the bar, rather than under it. Simultanously, arch your chest up toward the bar just as if you were doing regular Close-Grip Pull-Ups.

Now, begin to lower yourself down as you swing your head over toward the other side of the bar. Maintain the arch in your back. Don't straighten your arms any more

than indicated in the illustration below. As soon as you cross under the bar, pull yourself back up. You should feel as if you are leaning back throughout the exercise.

And so on for 6 reps. (Each time you raise your head up on one side of the bar, you have done 1 rep.)

When you become proficient at the exercise—and this may take some time—the swing from side to side will look and feel like a gymnastics exercise.

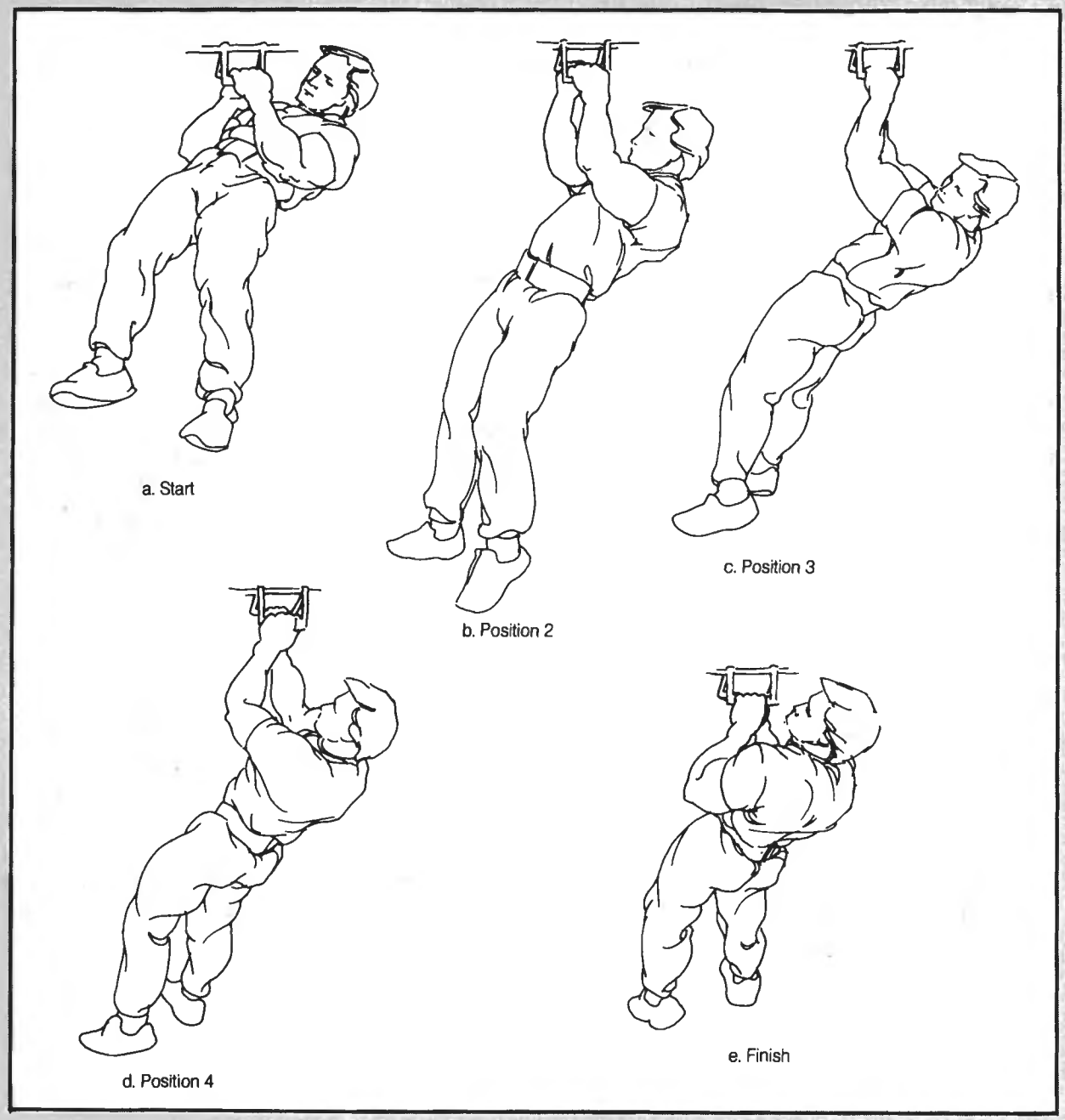


Fig. 5-13

LOWER BACK

Most of the muscles in the lower back extend (straighten) the spine. Collectively, these are called the Spinal Erectors. The Spinal Erectors work together with the abdominals to keep the spine upright, much like guy wires on opposite sides of a tent pole.

Given the role of the spine in overall health—and the debilitating nature of spinal injuries—this opposing muscle group pair is the most important in the body. Our **Legendary Abs** course covers conditioning the abdominals. Here, let's take a look at the factors concerning development of the Spinal Erectors.

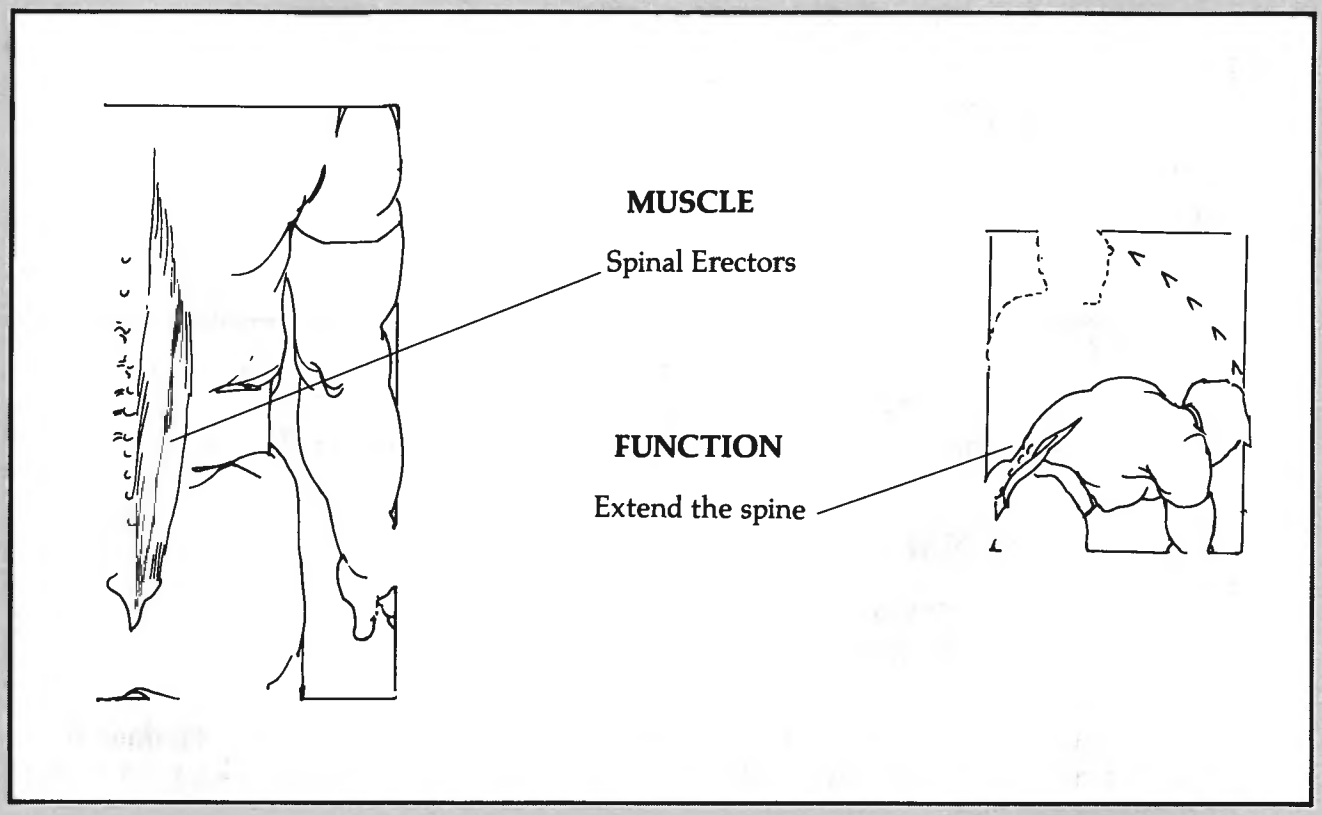


Fig. 5-14

Unlike the upper back, which includes two fan-shaped muscles (the lats and traps) and thus has several potential lines of force, the lower back consists only of straight muscles (the Spinal Erectors). All the Spinal Erectors run in the same direction, thus the lower back has only one line of force.

The Ideal Plane of Motion associated with this line of force is:

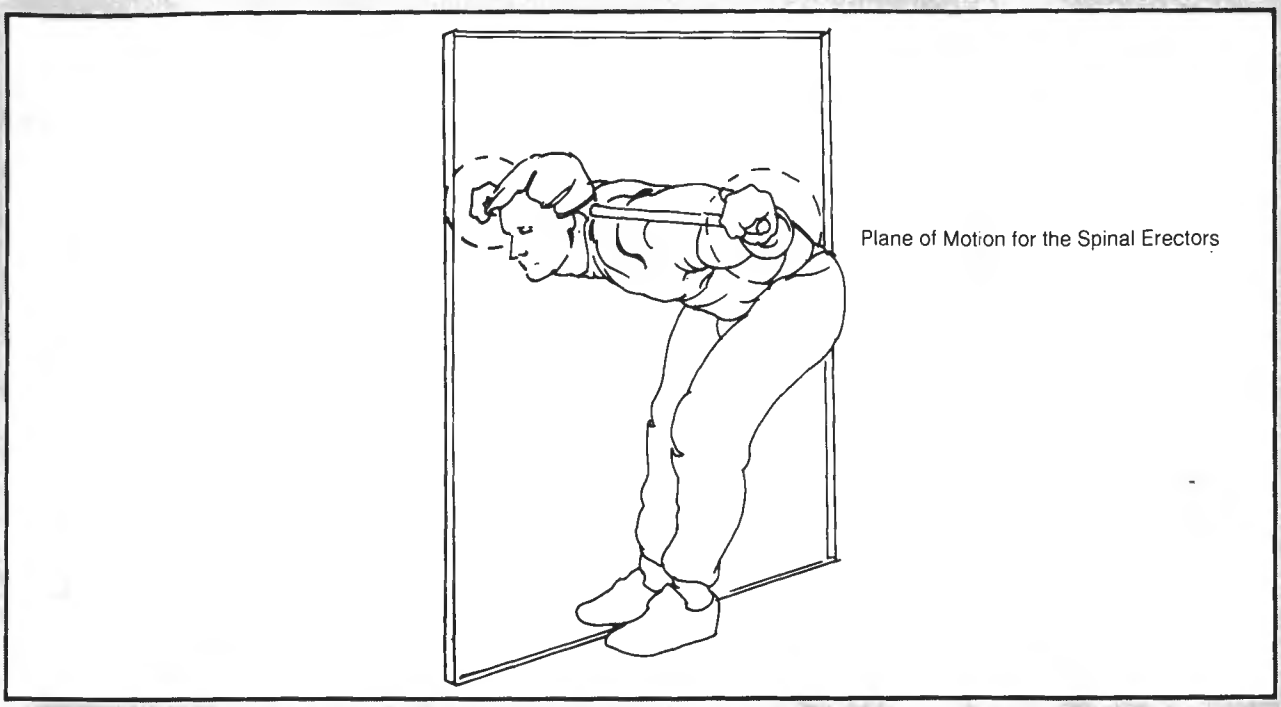


Fig. 5-15

Let's take a look at three exercises, and optimize in terms of this line of force.

HYPEREXTENSIONS

prime mover: spinal erectors
synergists: glutes, hamstrings

These are best done on a bench made for the purpose, but can also be done on the edge of a resilient surface like a bed, padded table, arm of a sofa, or the like, with someone holding your ankles.

Standard Technique

Lie face down, bent at the waist, hanging over the edge of the bench. Lightly rest your hands behind your head or neck, and slowly straighten your body to a horizontal position. Hold for a second, then lower and repeat.

Optimized Technique

Throughout the exercise, hold your head back as far as possible and arch your back as in a swan dive. **This applies at the bottom of the motion as well as at the top.** If you release the arch at any point, or worse, if you don't arch at all, you lose most of the effect on the spinal erectors.

And despite what you've been told in the past, current research indicates it's beneficial to come up slightly above the horizontal at the top of the movement.† Do so gently. **Don't use momentum** to lift yourself. Make the movement slow and smooth.

Finally, we recommend against trying to lace your fingers together behind your neck. If you maintain the proper arch, your fingertips will probably just reach your ears.

†This is a recent change. Follow this guideline even if you have older versions of our other courses which say not to.

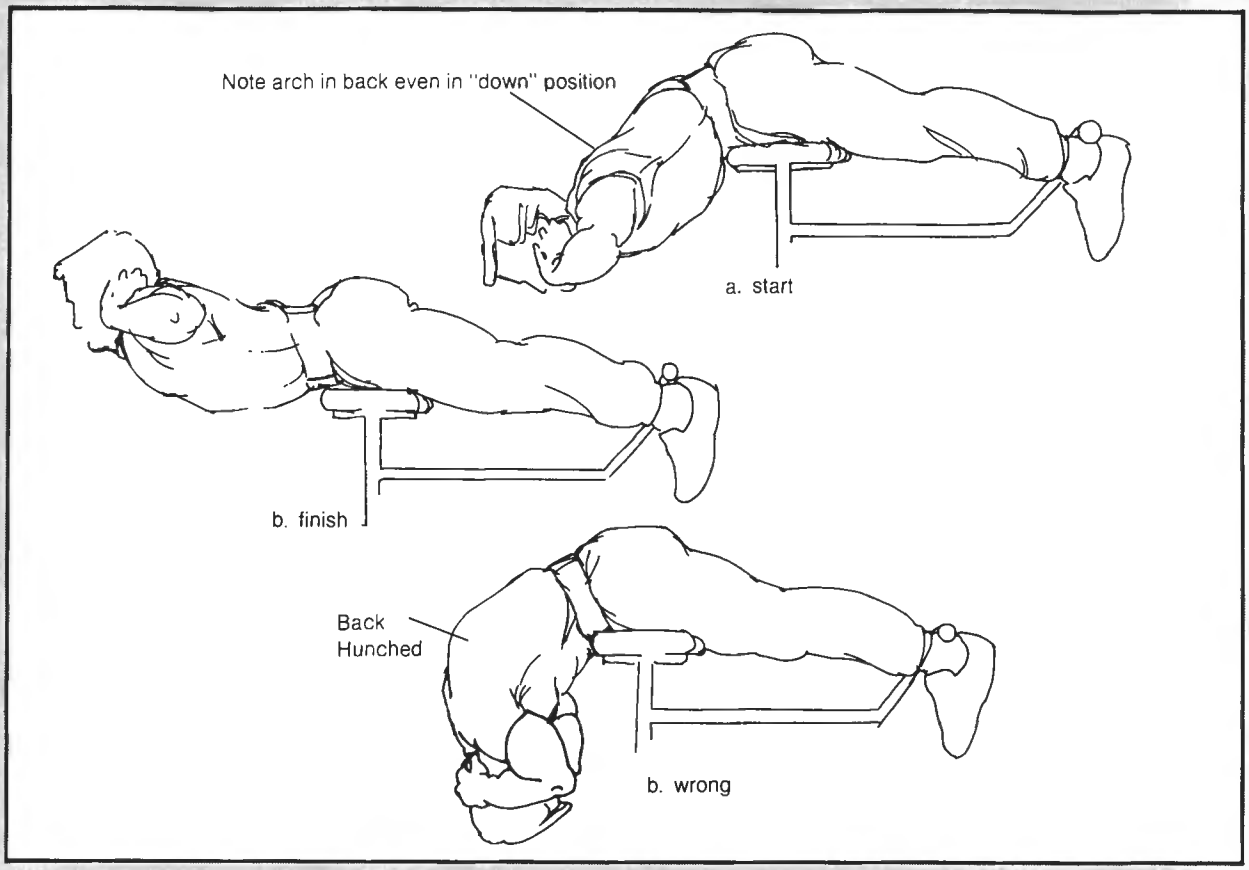


Fig. 5-16

ALTERNATE-SIDE HYPEREXTENSIONS

prime mover: spinal erectors
synergists: glutes, hamstrings, spinal rotatares

The Spinal Erectors is a *bilaterally symmetrical* muscle group—like your arms, you have two of them, one on each side of the spine.

Standard lower back exercises treat these two sections of the muscle group as if they were one. The Hyperextension exercise described above, for example, puts equal stress on both sections. It is possible, though, to increase the stress on one or the other section by rotating your trunk slightly as you hyperextend. This increases the resistance acting against the uppermost Spinal Erectors.

Begin as with standard Hyperextensions. But as you raise your body, rotate so one shoulder ends up higher than the other. Lower to starting postion. Repeat, rotating so the other shoulder ends up higher. 10-12 reps, 5-6 with each shoulder higher (alternating).

By doing one set of standard Hyperextensions ("more functional") and then a set of the Alternate Side Hyperextenstions ("more isolated"), you can greatly increase the effectiveness of your lower back workout.

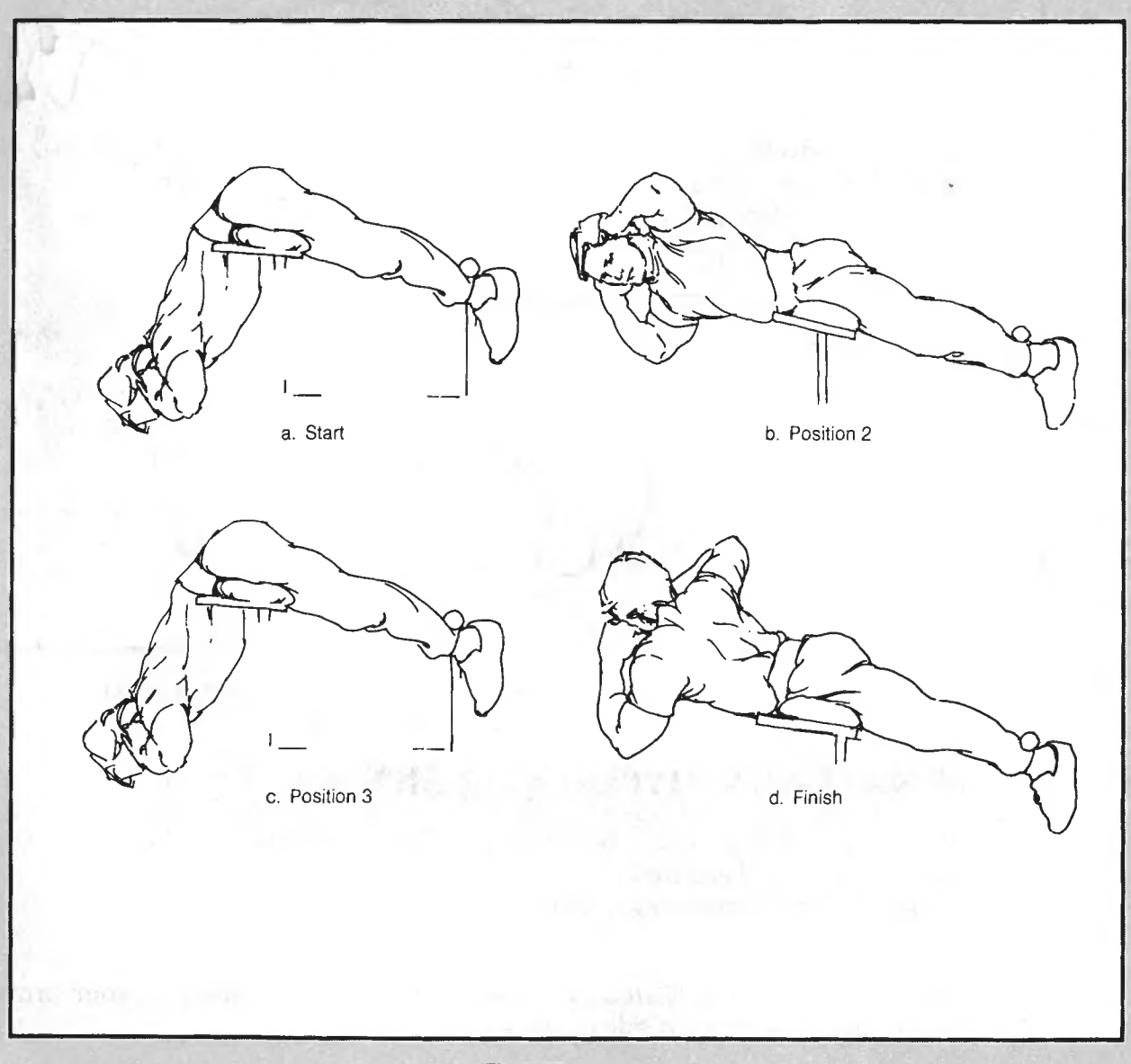


Fig. 5-17

GOOD MORNINGS

prime mover: spinal erectors
synergists: glutes and hamstrings

A word of caution: For some reason, it is difficult to evaluate the stress this exercise puts on the lower back while performing it. In fact, most people who try the exercise with, say, fifty pounds, will feel it is an inadequate load, but will be **painfully sore** the next day. The danger lies in incorrectly assessing the load and increasing it to a damaging level. **Be careful! You can easily injure your lower back with this one.**

Done correctly, however, the Good Mornings exercise is a safe and powerful tool for developing the spinal erectors. Also, it has a markedly different resistance curve from Hyperextensions, so the two make a good combination.

Standard Technique

Stand upright with a light barbell resting on your shoulders behind your head. Bend forward at the waist, keeping the legs straight. Go down until your torso is parallel with the floor, then slowly straighten up. Repeat for 6-8 reps.

Optimized Technique

Stand upright, **a slight bend in your knees,** a **light** barbell resting on your shoulders behind your neck. (Beginners—a broom handle may be sufficient. Regardless of experience, start light—no more than 10 to 20 lbs.) Bend forward at the waist until your torso is parallel with the floor.

You should **bend your knees** during this movement for the same reason you bend them during Single-Handed Cable Rows: Bending your knees decreases your risk of injury by (1) keeping the limitations of your hamstring and lower back flexibility from affecting your performance of the exercise, and (2), allowing your pelvis to tilt forward as you bend forward, substantially decreasing the strain on the lumbo-sacral joint.

At the bottom of the movement, your chest should be down against your thighs. Slowly straighten up, maintaining a slight bend in the knees.

A note about how much weight to use for this exercise: if it exhausts you in 6 to 8 reps, it's too much. Use a moderate load to decrease risk of lower back injury, and increase the number of reps to elevate your Fatigue/Tension level during the exercise. Do 10 to 12 reps.

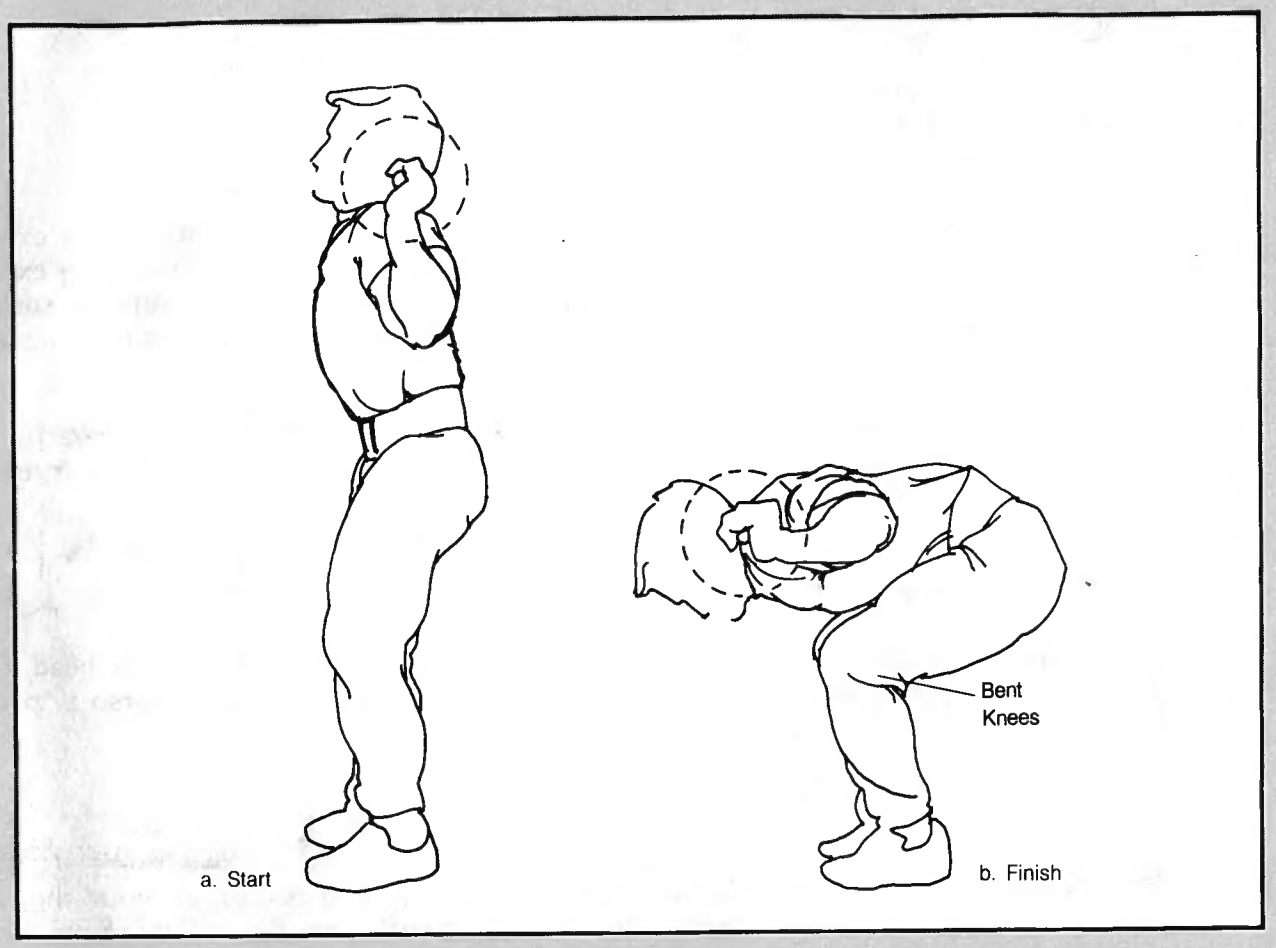


Fig. 5-18

CHEST

The chest is composed of two muscles, the Pectoralis Major and Pectoralis Minor. Both are fan-shaped muscles, and thus have several potential lines of force.

The Pectoralis Major attaches to the upper arm. Its function is to pull the upper arm across the chest. Depending on which segment of the muscle is active, the pecs can pull the arm **up** across the chest (upper pecs), **straight** across the chest (middle pecs), or, if you are starting with your arm up, **down** across the chest (lower pecs).

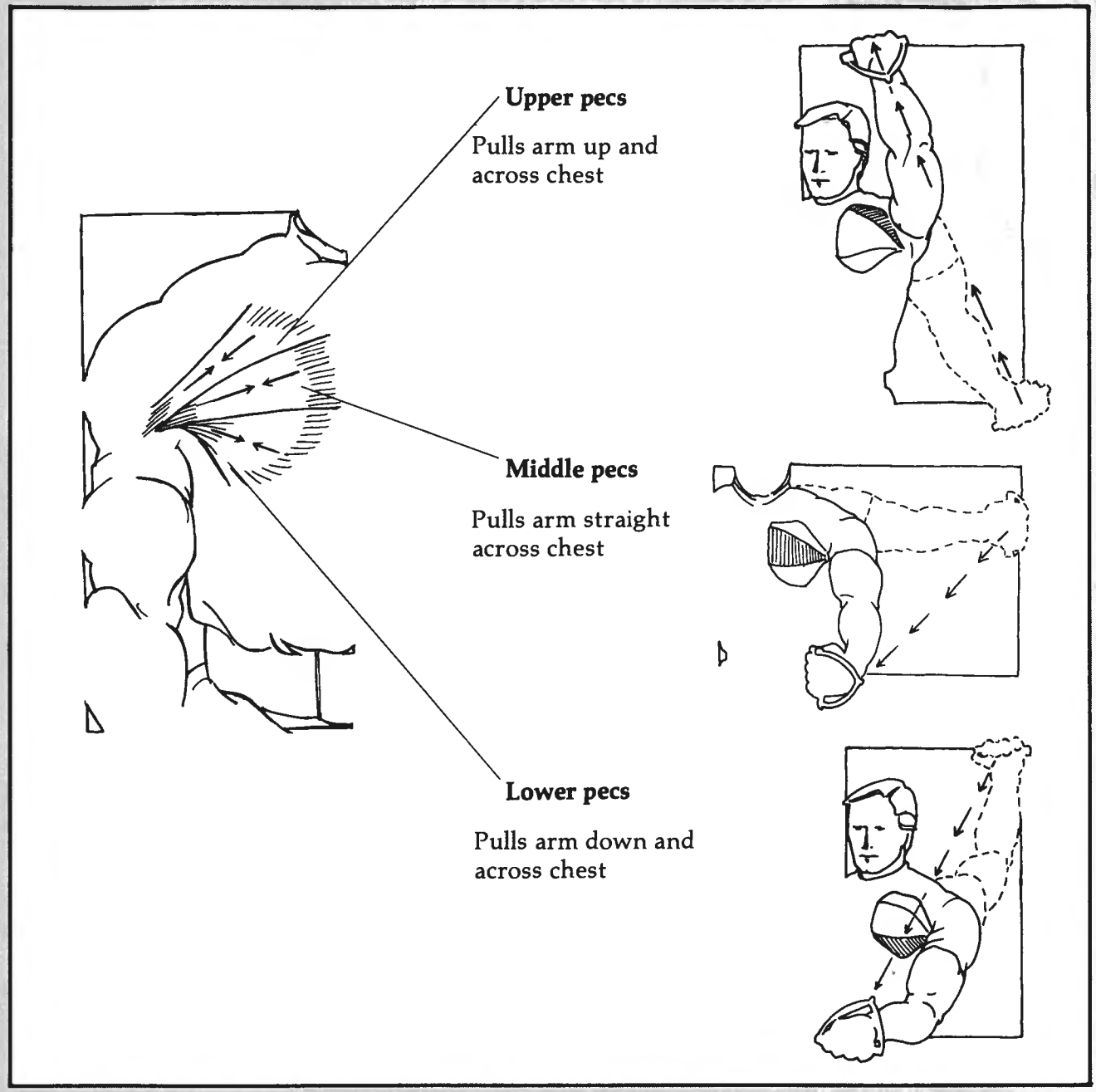


Fig. 5-19

The Pectoralis Minor lies mostly underneath the Pectoralis Major. Its function is to draw the shoulder blade down and forward. When you contract the Pec Minor, the motion that results looks like hunching the shoulders forward:

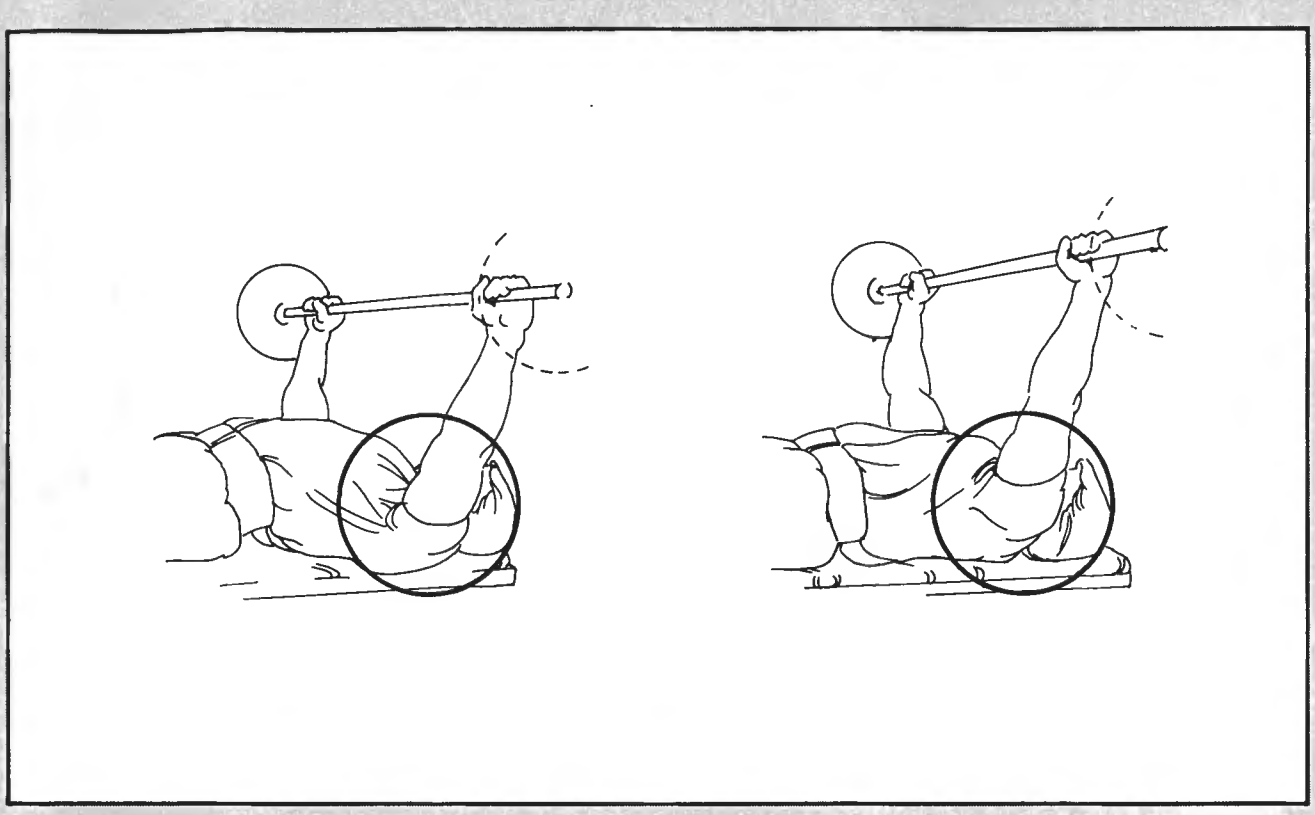


Fig. 5-20

A properly performed pec exercise calls both Pec Major and Minor into play—it calls for both motions: the arms moving forward *and* the shoulders hunching.

SUPINE (FLAT) BENCH PRESS

prime mover: pectorals
synergists: triceps, anterior deltoid

Almost everbody is familiar with this exercise, and most people do it correctly. However, it's worth checking out the fine points to make sure you aren't cheating yourself out of maximum efficiency.

Standard Technique

Take a wider-than-shoulder-width grip on a barbell. Lower the barbell to your chest. Exhale while pushing the bar back up. Repeat 6-8 reps.

Optimized Technqiue

Ideal Orientation for a Bench Press that targets the middle pecs calls for the arms to be extended straight up from the shoulders at the beginning of the lift when the bar is up, and the upper arms to be at about 70° angles to the body when the bar is down against the chest. This puts the bar just above the sternum.

The *Ideal Plane*, then (which contains the movement from one Ideal Orientation to the other), is not straight up and down. Due to the mechanics of the shoulders, arms, and pectoral muscles, **the Ideal Plane angles slightly backward.**

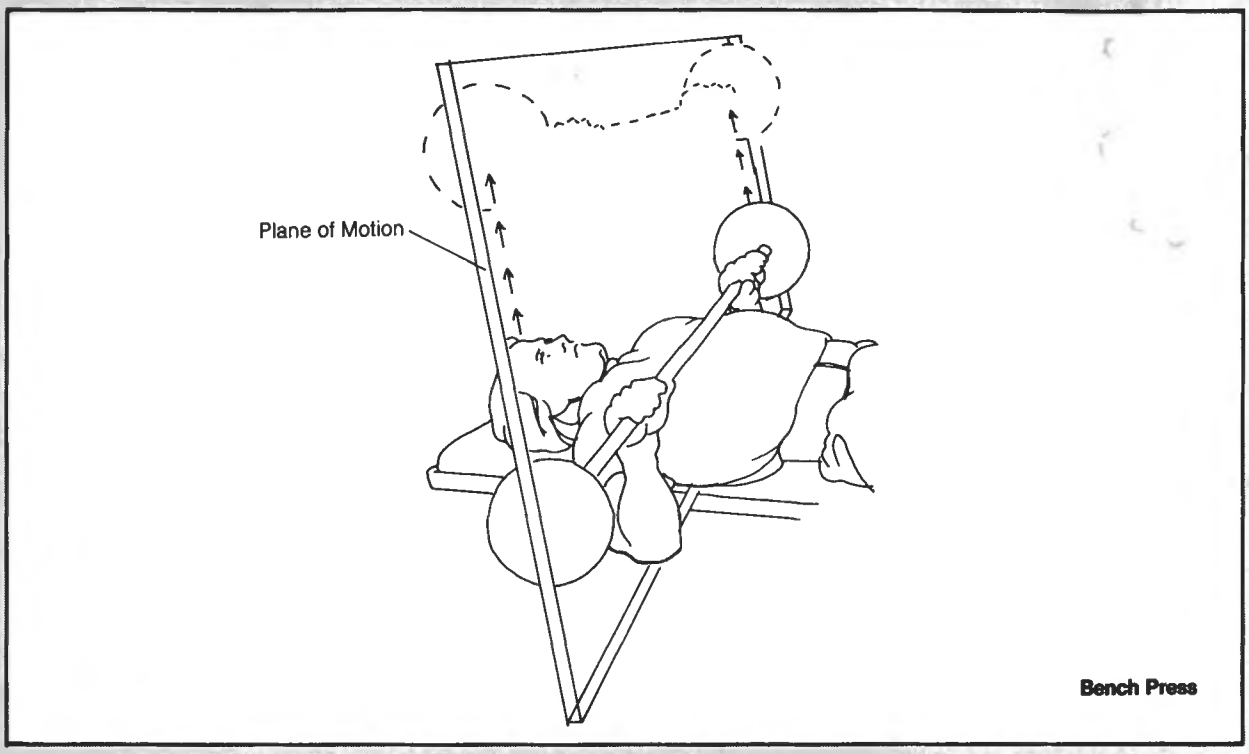


Fig. 5-21

So, to perform the exercise:

Hold a barbell with a grip just wide enough so your forearms are not quite parallel. Too narrow a grip shifts the load onto the triceps and makes it difficult to feel the tension in the chest.

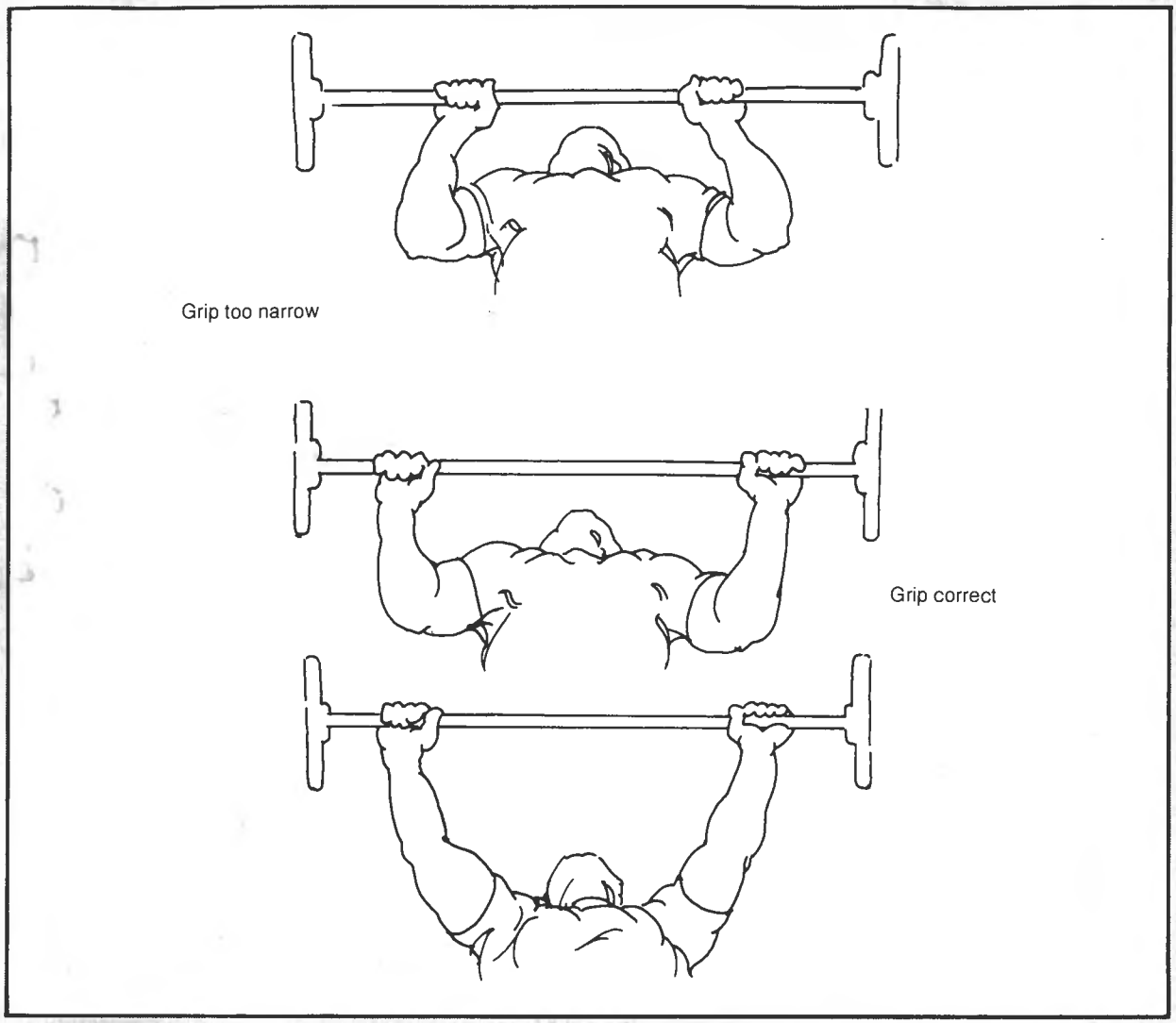


Fig. 5-22

Lower the bar to sternum level. The descent should follow the incline of the Ideal Plane. Your elbows should end up at 70° angles to your sides (see illustration).

Push the weight up and *slightly back* so the bar ends up over your shoulders. Pushing straight up shifts tension off your pecs onto your triceps decreasing the efficiency (and stability!) of the exercise.

Repeat for 6-8 reps.

Remember that arm movement works only the Pectoralis Major; the shoulders must hunch forward to stress the Pectoralis Minor. Feel for the shoulder movement throughout the lift. If you're just pushing with your arms, you're not working the whole Pectoralis group.

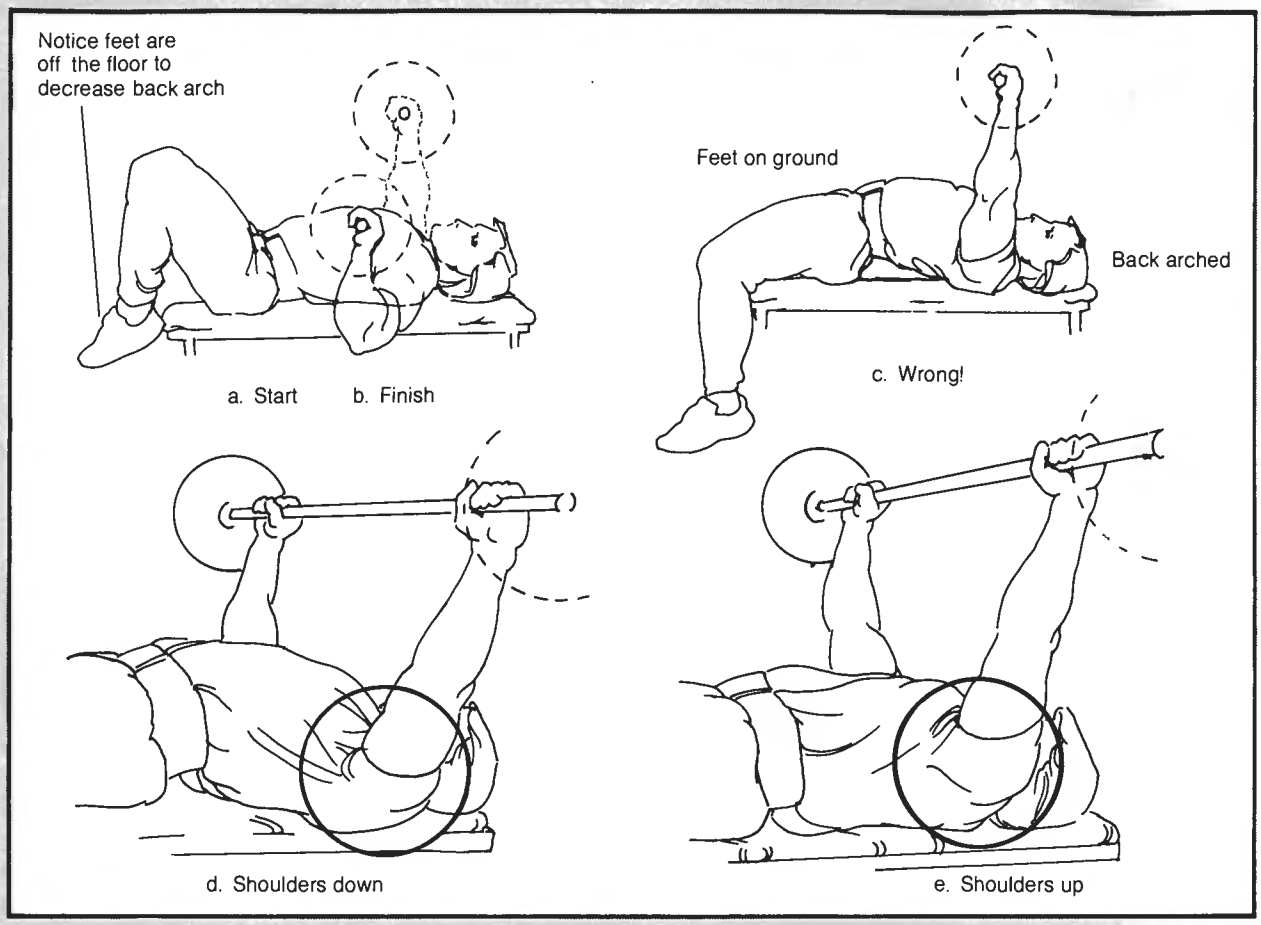


Fig. 5-23

INCLINE BENCH PRESS

prime mover: upper pecs
synergists: triceps, anterior deltoid

Optimized Technique

This bench press variation aligns the Line of Force for the upper pecs with the direction of resistance imposed by free weights.

All moving body segments should remain parallel to the Ideal Plane illustrated below. Also, **keep your back flat against the bench as you lift.** Arching the back puts the line of contraction across the middle pecs, essentially transforming the exercise into a supine (flat) bench press without proper back support. This is dangerous and a waste of time!

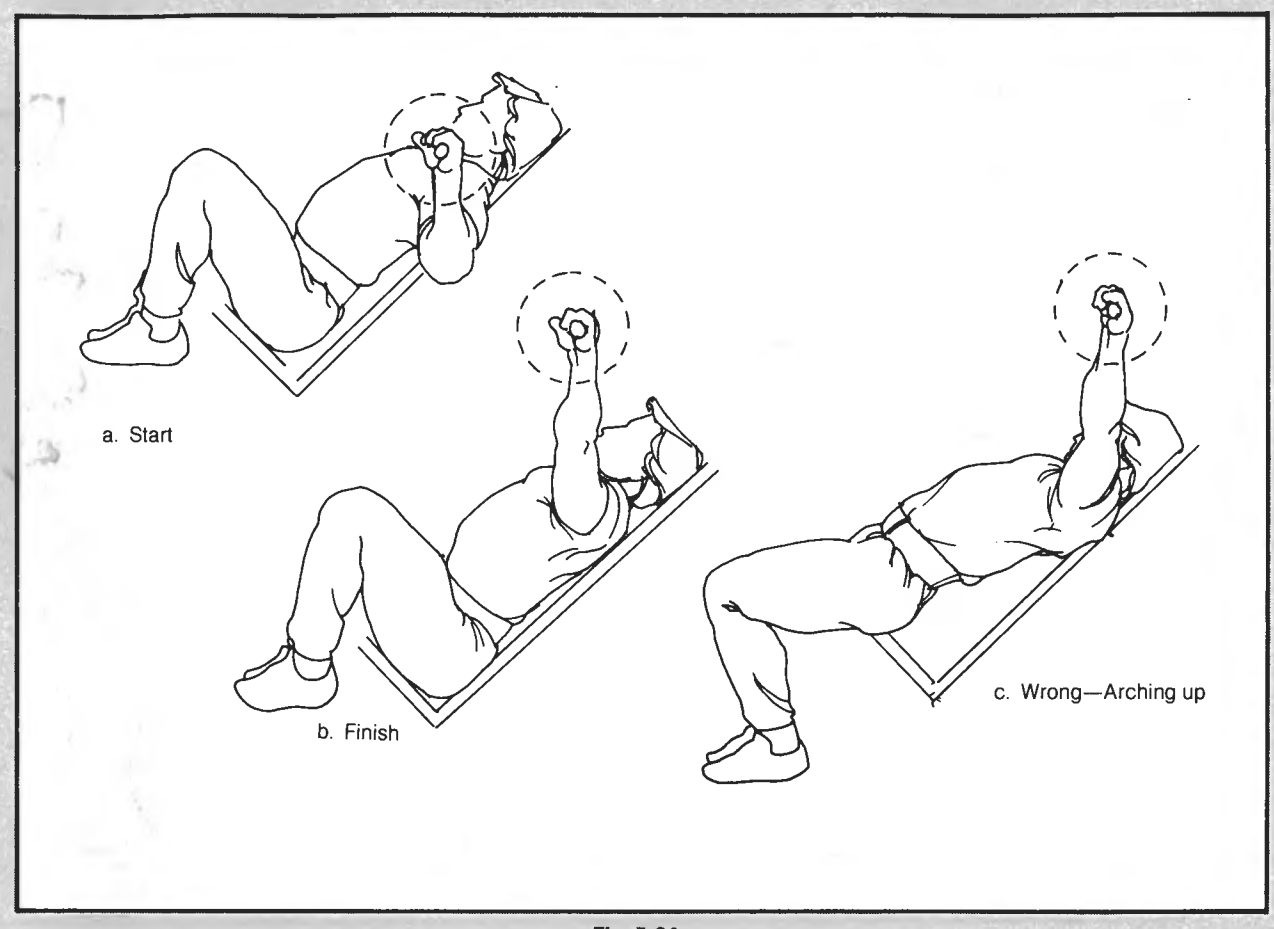


Fig. 5-24

INCLINE DUMBELL PRESS

prime mover: upper pecs, especially where upper pecs join the delts
synergists: tricps, anterior deltoid

This version of the Incline Press focuses on the area of the upper pecs close to the shoulder. Because dumbells do not limit your movement as much as a barbell does, it makes greater demands on the muscles functioning as stabilizers.

The resulting increase in strength of both the isolated area of the upper pecs and the stablizers produces greater available functional strength for pressing motions.

Standard Technique

Sit on (or, if your incline bench doesn't have a seat, lean against) an incline bench. Begin with a dumbell in each hand, palms facing forward, elbows bent, dumbells just to the sides of your shoulders. Press the dumbells straight up. Lower to shoulder level and repeat for a total of 6-8 reps.

Optimized Technique

If the incline bench you are using is adjustable, set it to a very steep angle (no more than 30° from vertical; see illustration). The steep angle focuses the exercise on the uppermost segment of the pecs. Then use the following technique to get the weights into position, to avoid unnecessary strain on the elbows, shoulders, and lower back.

Sit on the bench with a dumbell in each hand. Rest the dumbells on your thighs close to your knees as in Fig. 5-25a below. Kick up your legs, one at a time, to assist getting the weights into position up at your shoulders. In the starting position, the weights should be resting against your shoulders. Your elbows and forearms should be completely contained within the Ideal Plane (Fig. 5-25).

Press the dumbells up, following the path illustrated below. Remember, the pecs pull the arm up **and across the chest**. Following this path—as opposed to either of the "wrong" paths illustrated below—makes the exercise more stable and puts minimum emphasis on the main synergist, the triceps.

All moving body segments should remain in the Ideal Plane. Here, as during the barbell version of the incline press, you should keep your back flat against the bench as you lift.

At the top of the movement, hunch the shoulders forward and up to insure Pectoralis Minor involvement.

Lower the dumbells back to the starting position. At the bottom of the movement, feel for a stretch in the delts and pecs.

Repeat for 6-8 reps total.

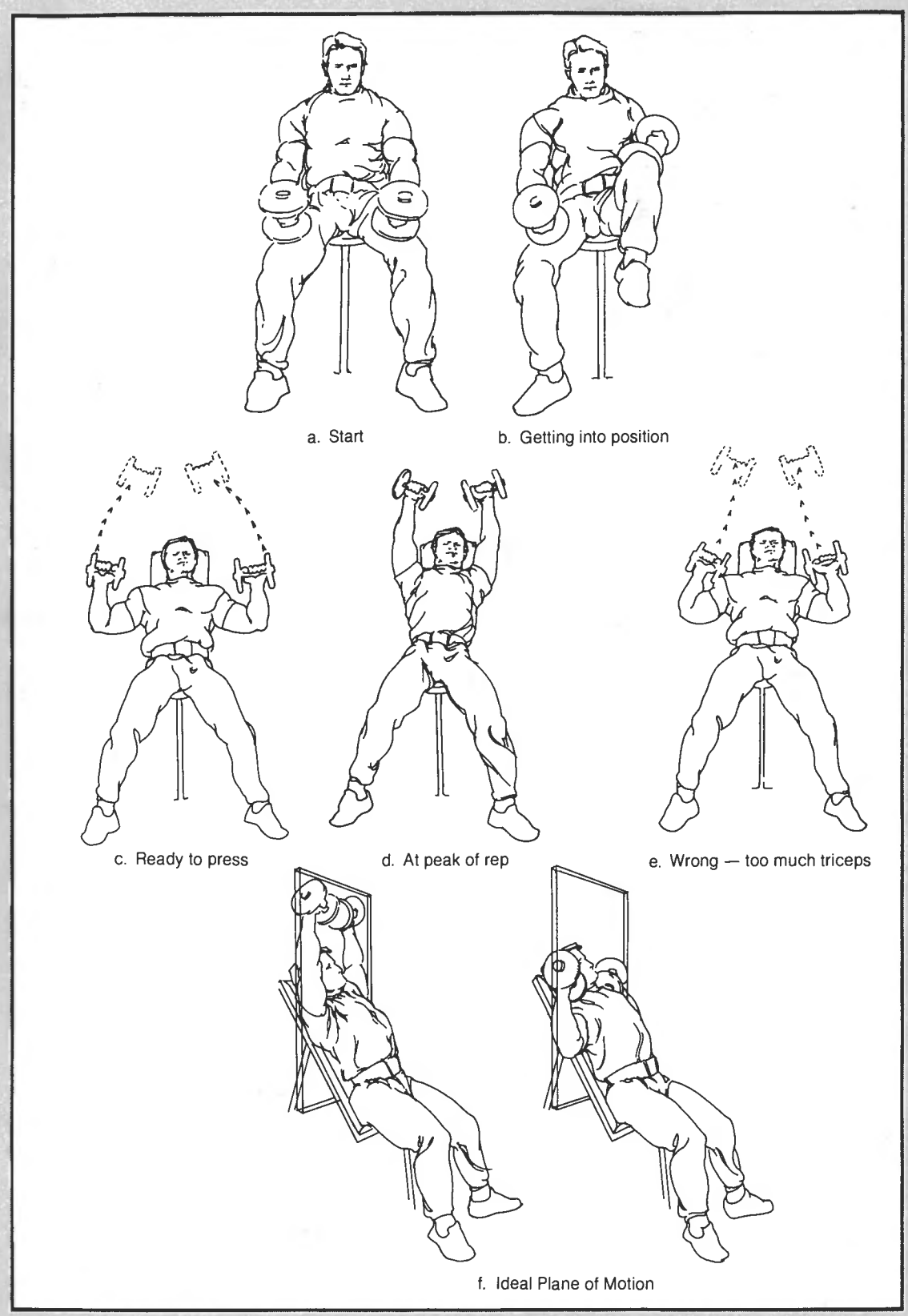

a. Start
b. Getting into position
c. Ready to press
d. At peak of rep
e. Wrong — too much triceps
f. Ideal Plane of Motion

Fig. 5-25

CHEST DIPS

prime mover: lower pecs
synergists: triceps

Some people think dips are a chest exercise; others think they're a triceps exercise. Truth is they can be either, depending on how the exercise is performed. Here, let's consider the method that targets the chest.

Standard Technique

Position yourself on dipping bars. Lower yourself until you feel the stretch in your chest, then push back up. Repeat for 6-8 reps.

Optimized Technque

Position yourself on dipping bars. Lower yourself until you feel the stretch in your chest. **Keep your head down, your body hunched forward, and your elbows out to the sides.** This positions all moving joints in the Ideal Plane.

If you straighten your body, the emphasis shifts off the pecs and onto the triceps.

Maintaining the hunched posture, push yourself up. Repeat for 6-8 reps.

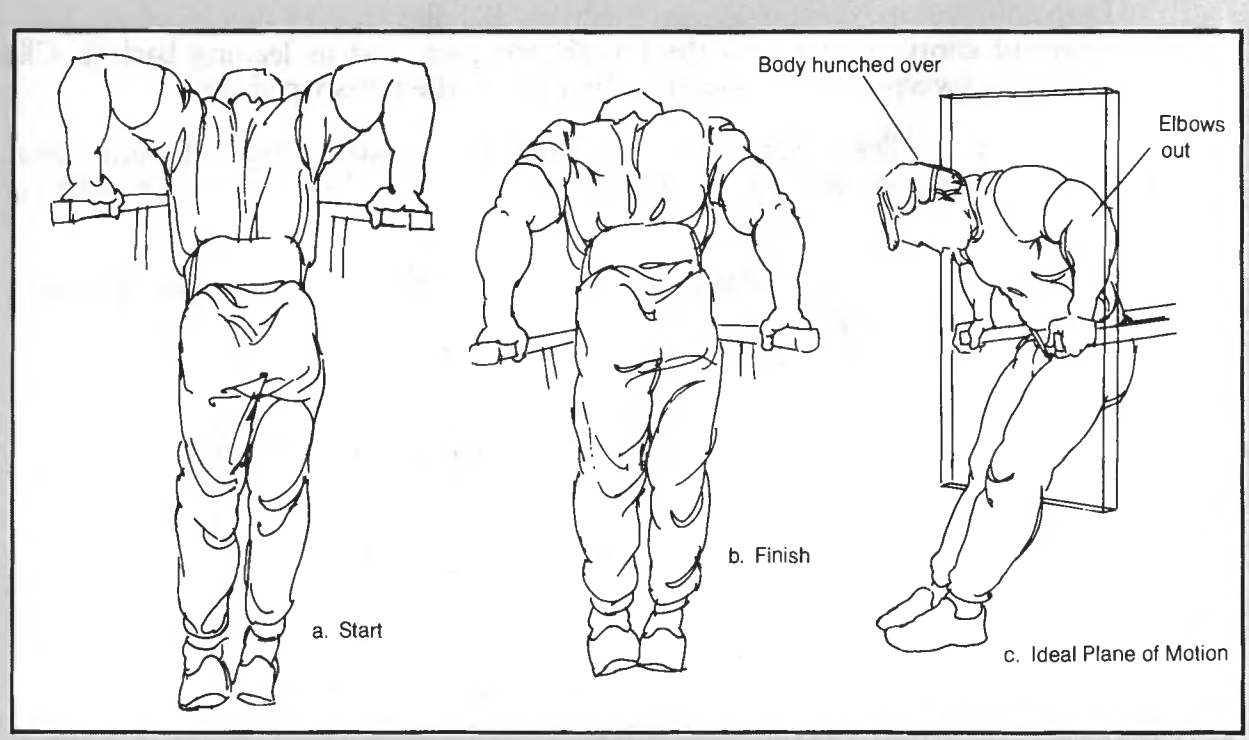


Fig. 5-26

CROSS-BODY CABLE PULLS

prime mover: section of the pecs along the sternum

Standard Technique

Hold a Cross-Body Cable Pulley handle in each hand. Pull in and across your chest until your hands touch, maintaining a slight bend in each elbow. Slowly release. Repeat for 6-8 reps.

Optimized Technique

Hold a Cross-Body Cable Pulley handle in each hand. Allow your shoulders to stretch out and up as much as possible, ensuring the greatest range of motion for the exercise. Your body should be fully upright.

Begin to bring the handles toward one another. At the beginning of the movement:

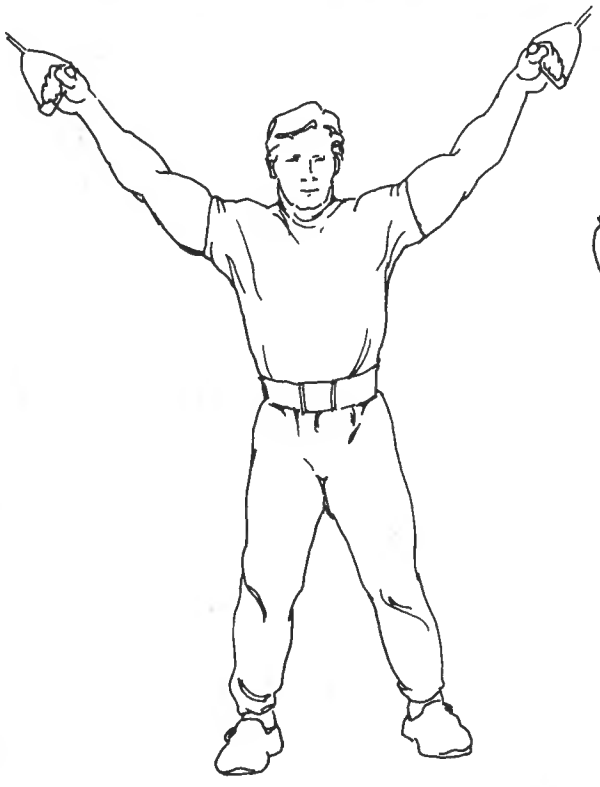
- your arms should rotate downward (this calls into play a function of the Pectoralis Major almost always ignored during exercise: inward rotation of the arms)
- your shoulders should hunch forward and down (Pectoralis Minor)

Continue to bring the handles toward one another. Maintain a constant slight bend in the elbows. Your elbows should be in the plane of motion, directly aligned with your arms.

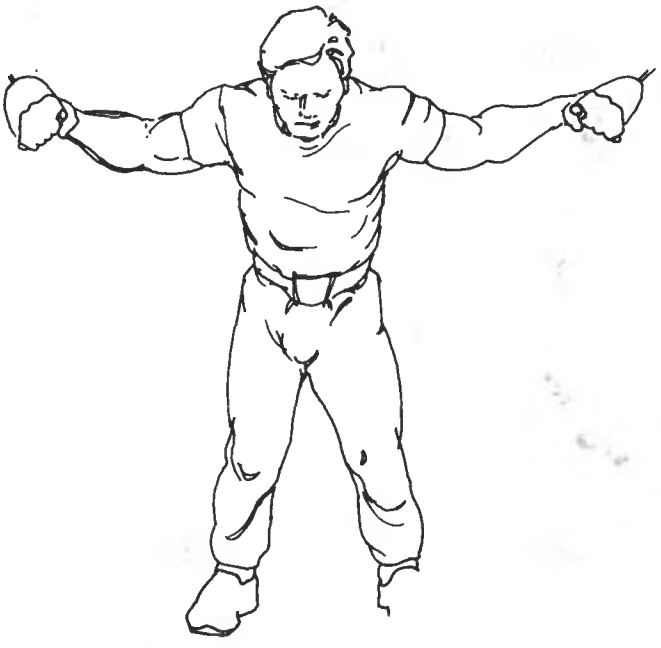
Lean into the movement as you push the handles toward one another. This sweeps the line of contraction across the fan-shaped pecs, just as leaning back in Close-Grip Pull-Downs sweeps the line of contraction across the fan-shaped lats.

When the handles touch, your arms should be pointed almost straight down, palms toward one another, and you should be bent over to about a 45° angle with your back hunched.

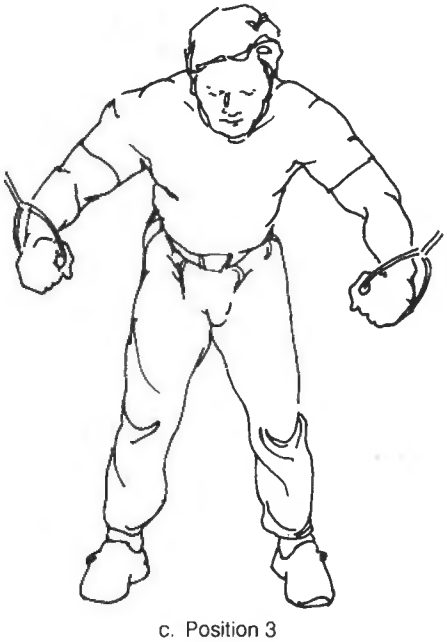
Hold for a second, then slowly release. Feel for the stretch in your shoulders before beginning the next rep.



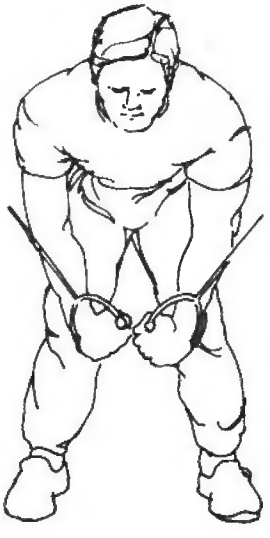
a. Start



b. Position 2



c. Position 3



d. Finish

Fig. 5-27

DELTOIDS

The Deltoid is another fan-shaped muscle. Each of its three segments— anterior (front), lateral (side), and posterior (rear)—has a line of force and a corresponding movement:

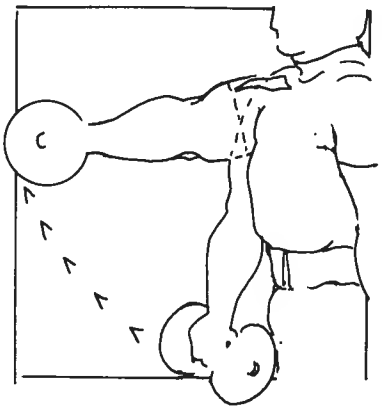
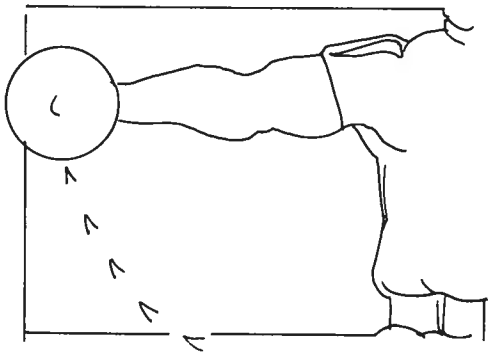
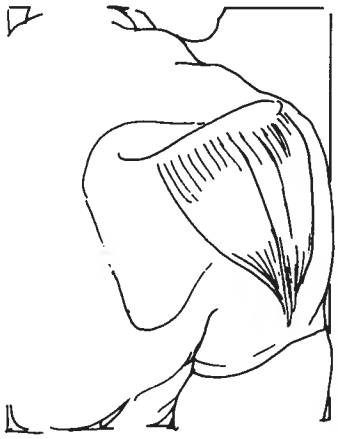
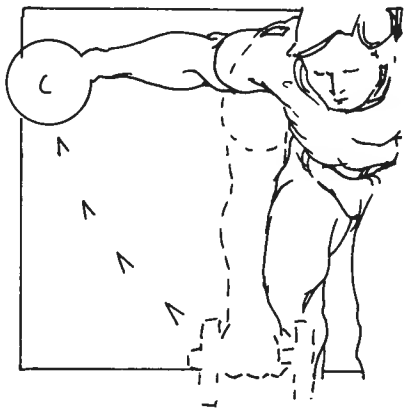
MUSCLE SEGMENT			FUNCTION
Anterior (front) Deltoid			Raises arm toward the front and rotates arm inward
Lateral (Side) Deltoid			Raises arm to the side
Posterior (rear) Deltoid			Raises arm toward the rear and rotates arm outward

Fig. 5-28

21's

One of the best deltoid exercises combines movements for all three heads of the delts into one giant set. It's called "21's" (pronounced "Twenty-ones"), since in standard format you do 7 reps of each of 3 positions, one for each deltoid head—a total of 21 reps with **no rest**.

The Interdependency Principle determines the order of the three segments of the exercise. You should do Lateral Raises (for the side shoulder) first, since action by the lateral head of the delts calls on the front and rear shoulder segments to act as synergists.

Since 21's is really three separate exercises, we will discuss each separately below.

a. LATERAL (SIDE) DELTOID FLYS

prime mover: lateral deltoid head
synergists: posterior and anterior deltoid, upper traps

Standard Technique

Hold two dumbells, one in each hand at your side, palms facing your side. Lift the weights out to the side up to about shoulder level. Lower and repeat.

Optimized Technique

A subtle shift of position turns this from a moderately good exercise into an extremely good one. Some bodybuilders may be familiar with the technique—it's called "pouring water."

When raising the weights (up to shoulder level, no higher), pretend that instead of dumbells, you have pitchers of water in each hand and that you are going to water some plants up at shoulder level.

Allow your elbows to bend and your forearms to drift slightly forward out of the Ideal Plane (illustrated below). Your upper arms should remain in the Ideal Plane, however. As you reach the top of the movement, rotate your shoulders forward so the front plates of the dumbells are slightly lower than the rear plates—just as if you were pouring water. This will raise your elbows slightly. The rotation should come from your shoulders, *not your wrists or arms.*

The pouring motion positions the Lateral Deltoid to take the brunt of the strain. If you don't "pour," the Anterior (front) Deltoid helps out too much, decreasing the efficiency of the exercise.

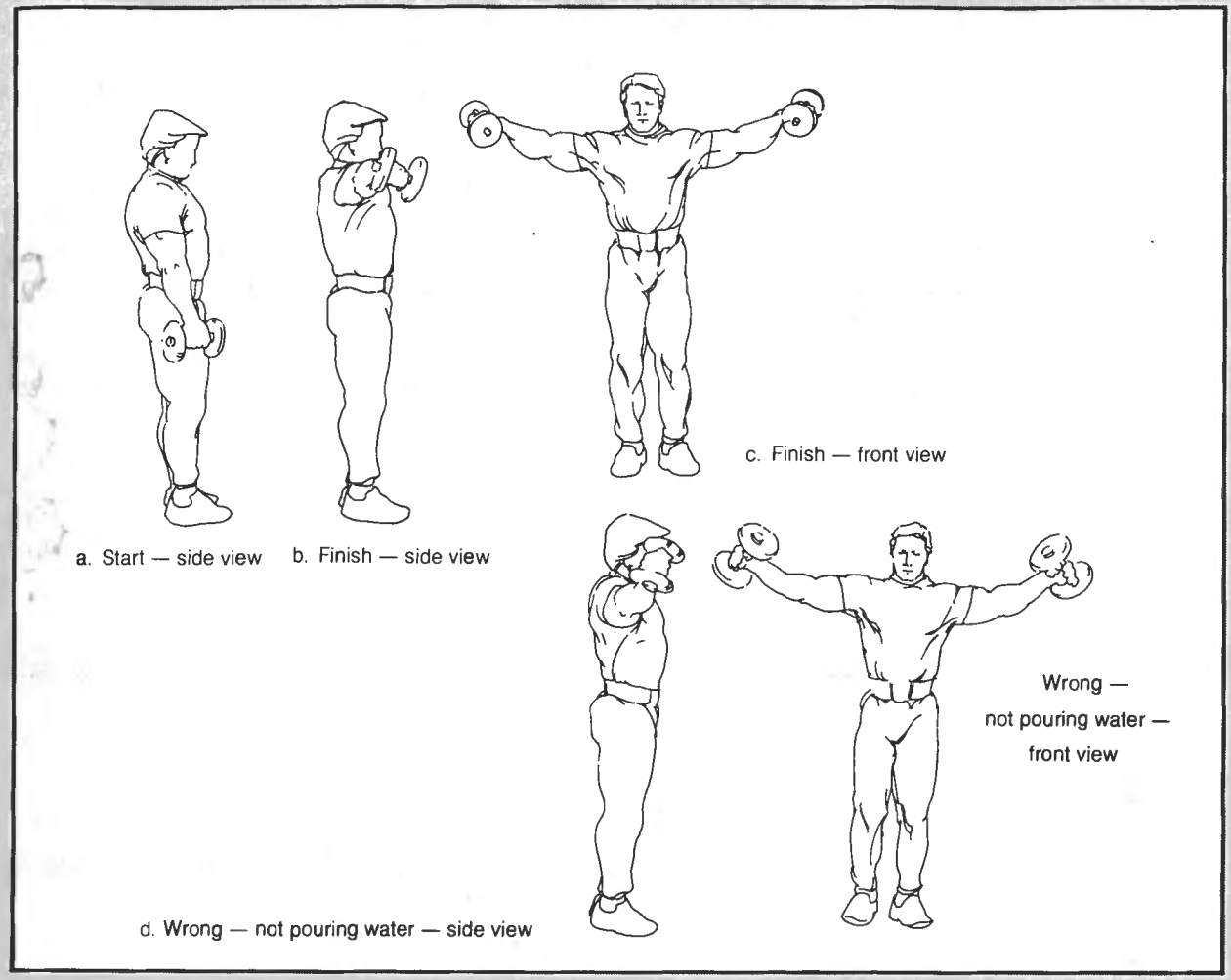

a. Start — side view
b. Finish — side view
c. Finish — front view
d. Wrong — not pouring water — side view
Wrong —
not pouring water —
front view

Fig. 5-29

b. ANTERIOR (FRONT) DELTOID FLYS

prime mover: anterior deltoid (front shoulder) raise
synergists: upper trapezius

Standard Technique

Hold a dumbell in each hand, palm down. Keeping the arms parallel, lift the dumbells up to about shoulder level.

Optimized Technique

Common Knowledge asserts you should only "pour water" during a Lateral Delt Fly. This is wrong. Since the front shoulder (anterior deltoid) is not only responsible for raising the arm forward, but **also for rotating the arm inward,** you should pour water during Anterior Delt Flys as well. This will increase anterior delt involvement and increase growth.

At first thought, there may appear to be a contradiction between the explanation for the previous exercise and this one. We advise pouring during *Lateral* Delt Flys to *decrease* anterior delt involvement; we advise pouring during *Anterior* Delt Flys to *increase* anterior delt involvement. What gives?

Pouring has different effects in different positions. During Lateral Delt Flys, you pour to position the lateral delts to take the brunt of the strain. The pouring itself isn't working the muscles harder, it's just positioning your arms so the lateral delts are forced to do most of the work. During Anterior Delt Flys, on the other hand, the pouring *is* making the target muscle segments work harder. Inward rotation is one of the functions of the anterior delts. Forcing the muscles to inwardly rotate the arms **at the same time they are being called upon to raise the arms** increases the work done, increasing the effectiveness of the exercise.

Bear the following in mind as you perform this movement: First, make sure you keep your arms parallel—the Ideal Plane Rule, again. Second, do not bring the weights up higher than shoulder level. Beyond that point, the tension on the Anterior Deltoid falls off rapidly. Third, keep your shoulders *down* during the exercise. Raising them wastes energy on your upper traps (which we are not training with this exercise).

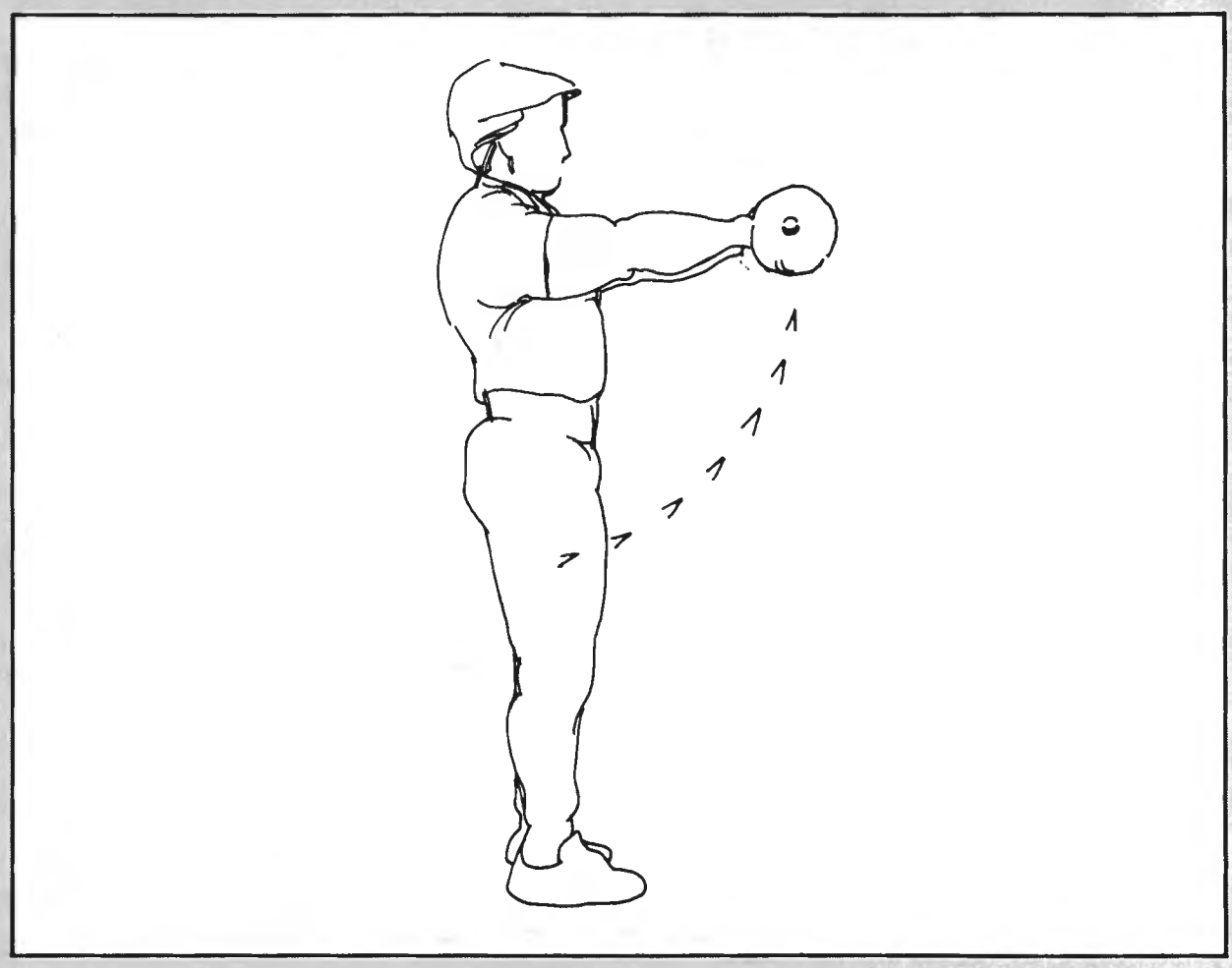


Fig. 5-30

c. POSTERIOR (REAR) DELTOID FLYS

prime mover: posterior deltoid (rear shoulder)
synergists: center traps

Standard Technique

Holding a dumbell in each hand, bend forward at the waist until your body is parallel with the floor. Your arms should be hanging down in front of you. Raise the weights to the side up to body level. Lower and repeat for 6-8 reps.

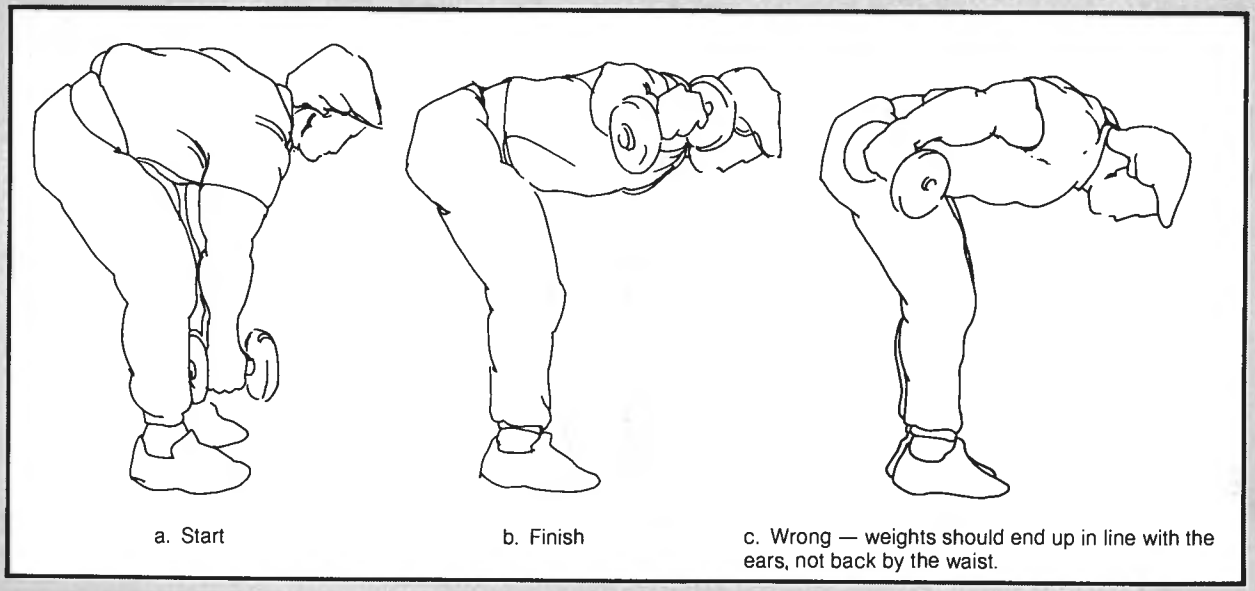
Optimized Technique

This exercise is almost always done incorrectly! The ordinary set-up is just fine (although as you start using heavier weights, you might try lying on a high bench while doing the exercise, to take the strain off your lower back.)

However, it is extremely important not to follow the "natural" (read "easy") line and lift the weights back toward your waist when performing the exercise. If your arms angle back, the *lats* take over and *the rear delts do very little work.*

To perform the exercise most effectively, **keep your elbows slightly bent, and lift so the weights end up in line *with your ears.*** Also, the weights should come up in an arc, since the posterior delts rotate the arm as well as pulling the arm up and back (see illustration).

This is very hard, but extremely effective. If you've been doing the exercise incorrectly, don't be surprised if you have to decrease the amount of weight drastically to do it right.



a. Start

b. Finish

c. Wrong — weights should end up in line with the ears, not back by the waist.

Fig. 5-31

UPRIGHT ROWS / MILITARY PRESS

prime mover: anterior and lateral deltoid
synergists: upper traps, triceps

Alone, neither Upright Rows nor Military Press is particularly noteworthy. Together, though, they will do amazing things for your delt development. Although both stress the front and side shoulder, *they use different synergists.* Upright Rows relies on the upper traps, and, to a minor extent, the biceps. Military Press, on the other hand, relies on the triceps. By supersetting the two exercises, you can push the delts much further than you can using either exercise alone. We guarantee a mind-blowing delt burn!

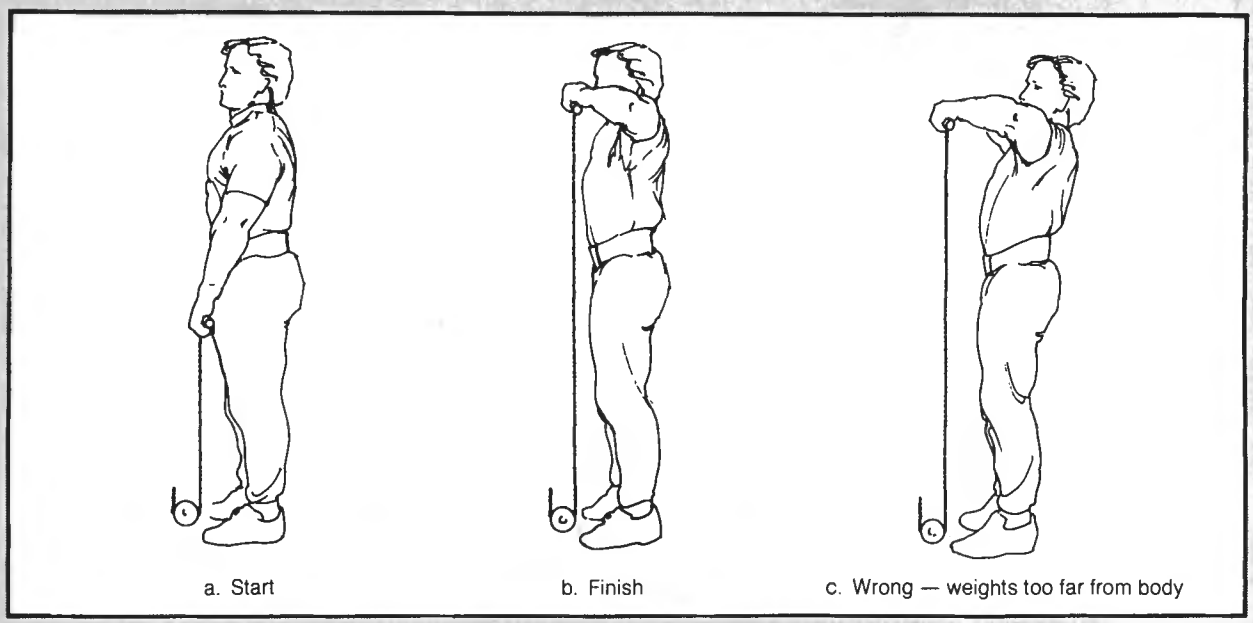
Supersetting these two offers another advantage. Military Press is an excellent functional strength exercise, but it can put a lot of pressure on the spine. By pre-exhausting the delts with Upright Rows, you decrease the amount of weight necessary to maximize delt fatigue during Military Press.

Optimized Technique

Upright Rows

If you have access to a pulley machine, use it for this exercise. Otherwise, a barbell will do.

Hold the barbell or pulley bar in the middle, palms down, hands touching one another. Stand directly above the pulley, if possible. Pull straight up until your arms are at shoulder level. **Keep the bar close to your body.** If you pull up with the bar away from your body, the exercise focuses on the anterior delt only. Hold for a second, then lower and repeat. 6-8 reps.



a. Start b. Finish c. Wrong — weights too far from body

Fig. 5-32

Military Press

In the interest of developing functional strength, we recommend using free weights instead of any of the Military Press machines found in most gyms. That's assuming your gym has a Power Rack or weight stand you can use so you don't have to pick up the free weight bar from the floor (clean the weight). If your gym doesn't have a rack, a machine is a safer bet.

Adjust the rack to support the bar at shoulder level. Hold the bar with a wide grip (see illustration); too narrow a grip shifts the focus to the triceps. Slowly press the bar straight over your head. The delts' Line of Force defines the Ideal Plane of motion illustrated below. Keep your arms within the plane as you lift.

Lower and repeat. 6-8 reps.

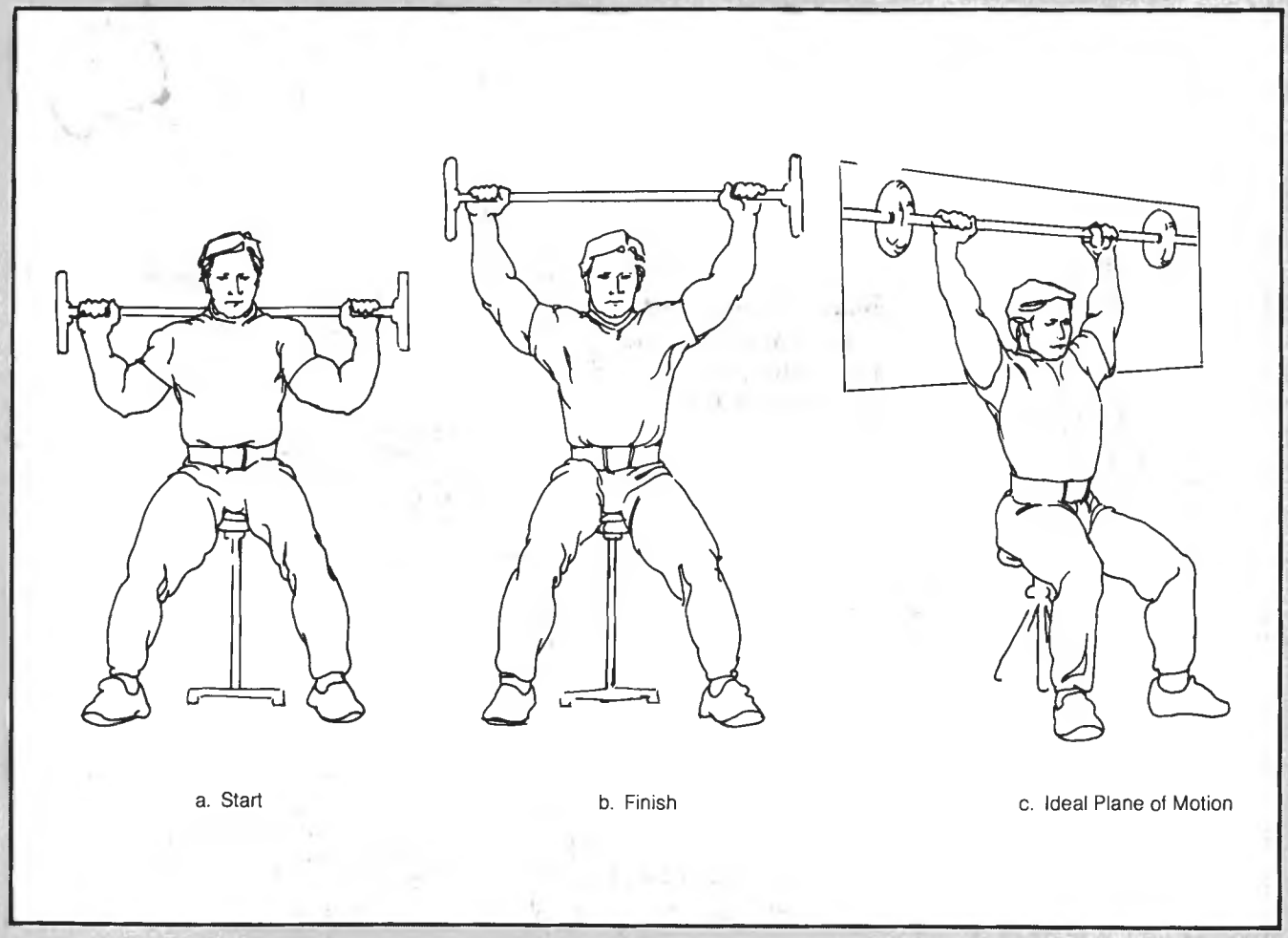


Fig. 5-33

Remember, these two exercises are done back-to-back, without rest:

1 set Upright Rows
no rest
1 set Military Press

BICEPS

The bicep is a straight muscle with two "heads," each of which has its own function.

The long head bends the elbow and raises the arm forward at the shoulder. The short head *supinates*† the hand.

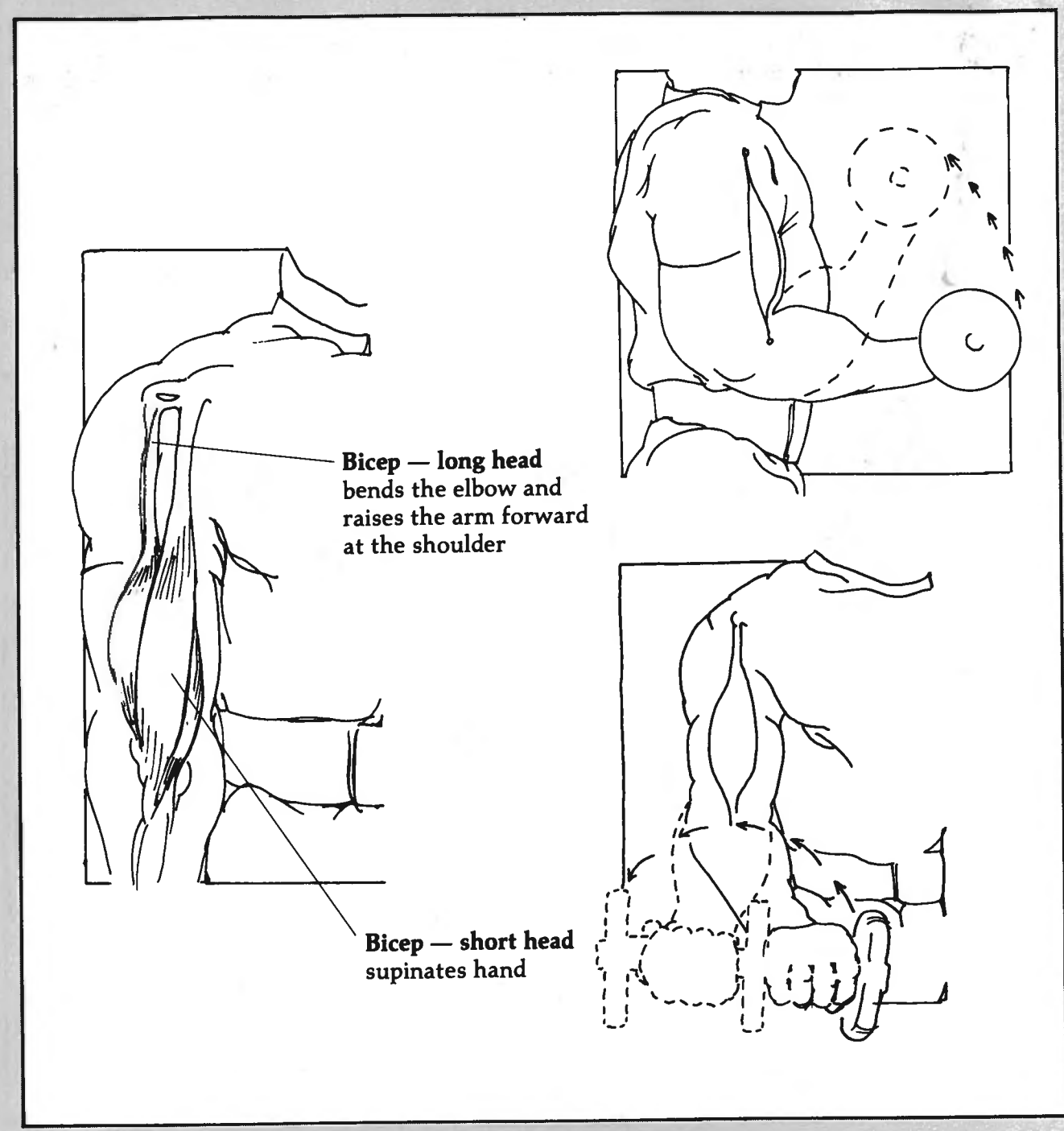


Fig. 5-34

†Stand with your arm at your side, palm facing back. *Supination* involves rotating the arm, thumb moving forward so your palm ends up facing forward.

The Ideal Plane of Motion for the curl is defined by the biceps' line of force, the direction of resistance, and the position of least strain on the ligaments of the joints involved. That criteria actually defines a number of possible planes for the biceps:

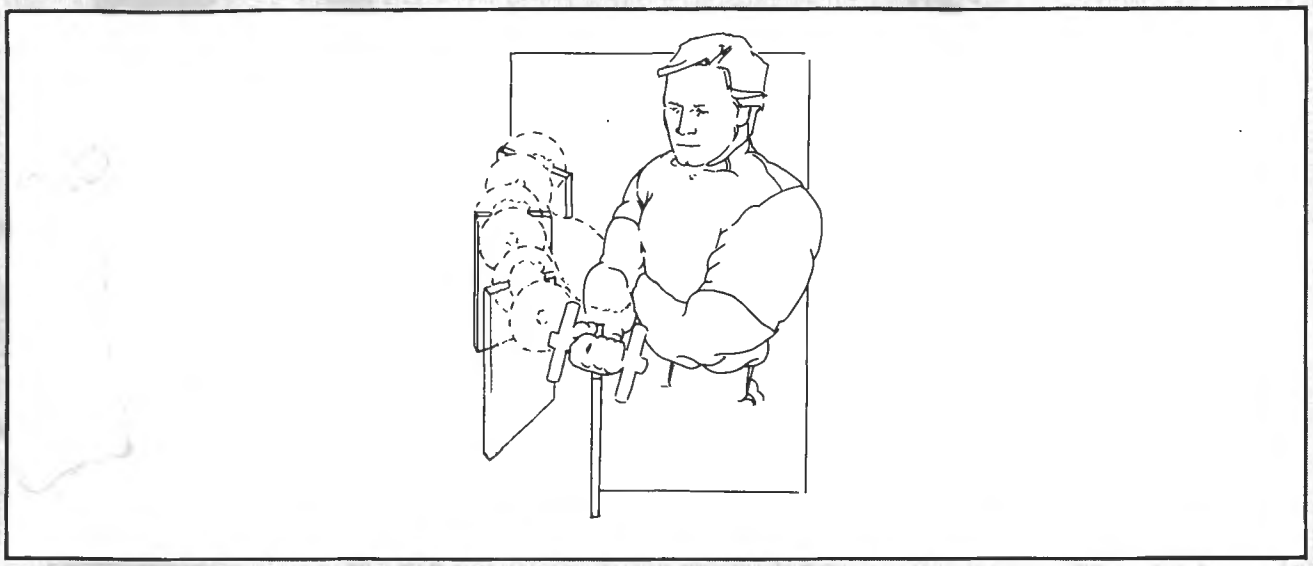


Fig. 5-35

However, when using a barbell or other two-handed bar for curling motions, the *only* plane that meets the criteria is the one illustrated in Figure 5-36 below. Tilting the arms in or out "to shift the emphasis from the inner to the outer biceps" is dangerous and ineffective. Since the short head is primarily responsible for supinating the wrist, not flexing the elbow, tilting the arms only places potentially damaging stress on the wrist and elbow joints without shifting the emphasis at all.

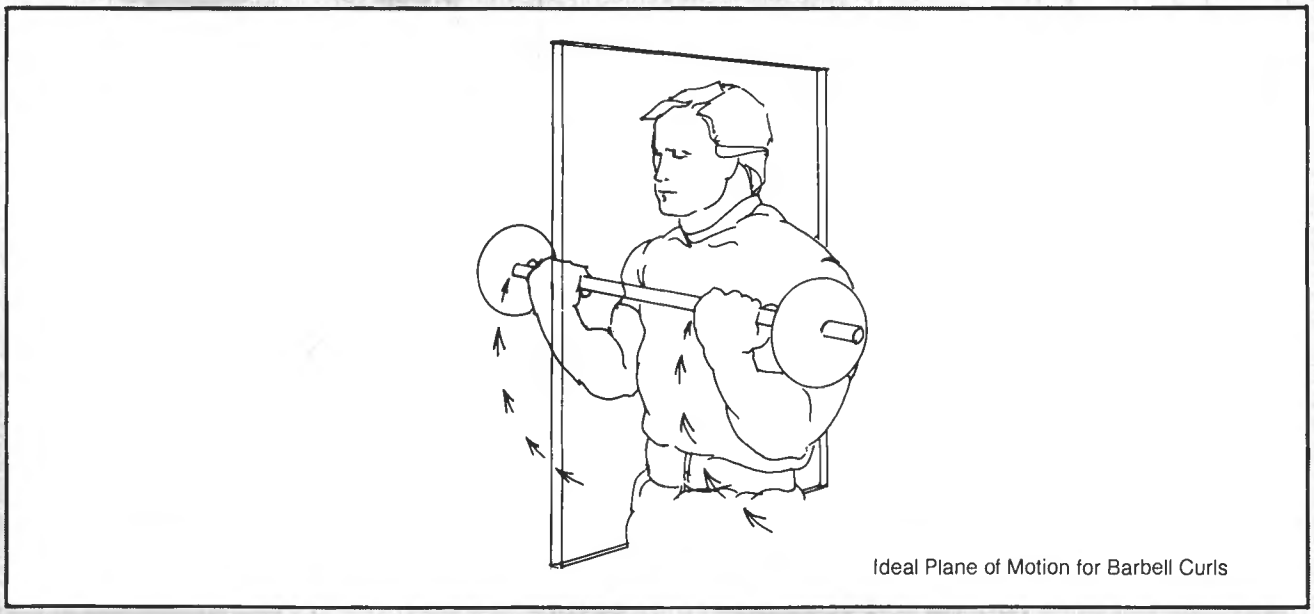


Fig. 5-36

Let's take a look at some bicep exercises as a basis for discussion of some other points.

PREACHER BENCH CURLS

prime mover: biceps, brachialis
synergists: deltoids, trapezius

Preacher Curls have two advantages over the standard Standing Barbell Curl: (1) They put considerably less strain on the lower back, and (2), they do a better job isolating the biceps.

Standard Technique

This exercise can be done with a standard barbell, a cambered or "E-Z" Curl bar, or a straight or angled bar and a low pulley machine.

Take a shoulder-width grip on a barbell/E-Z Curl Bar/Angled Bar. Position yourself over the Preacher Bench so your armpits are against the top of the bench. Curl the weight up to your chin, keeping your upper arms parallel throughout the motion. Lower and repeat.

Optimized Technique

If you have access to a low pulley machine and an angled bar, we recommend using them. The pulley compensates for some of the deficiencies of the free weight resistance curve—like loss of resistance at the top of the movement; the angled bar decreases the strain on the wrists.

Take a slightly narrower than shoulder-width grip on the bar. This grip puts the least strain on the elbows. Position yourself over the Preacher Bench so the top of the bench catches you about mid-chest, or a bit lower. The section of your triceps just above the elbow should rest against the bench. Once in the proper position, you should be leaning over the bench slightly.

Curl the bar up to your chin, leaning into the movement as the bar comes up. Leaning prevents your forearms from being positioned straight up and down at the peak of the movement, maintaining tension in the biceps.

This concept also applies to Standing Barbell Curls. If you must do them, wear a weight belt, and, as you curl the bar, lean slightly into the movement to avoid vertical forearms at the peak. The key word here is *slightly*. There's enough strain on the lower back during Standing Curl without increasing it by bending double at the waist.

You can also increase the intensity during any kind of curling exercise performed with free weights by keeping your wrists bent back during the curl (Fig. 5–37). This accomplishes the same thing as leaning into the curling movement at the top: it keeps some resistance on the biceps even when the forearms are almost vertical. This is especially effective during Seated Dumbell Curls.

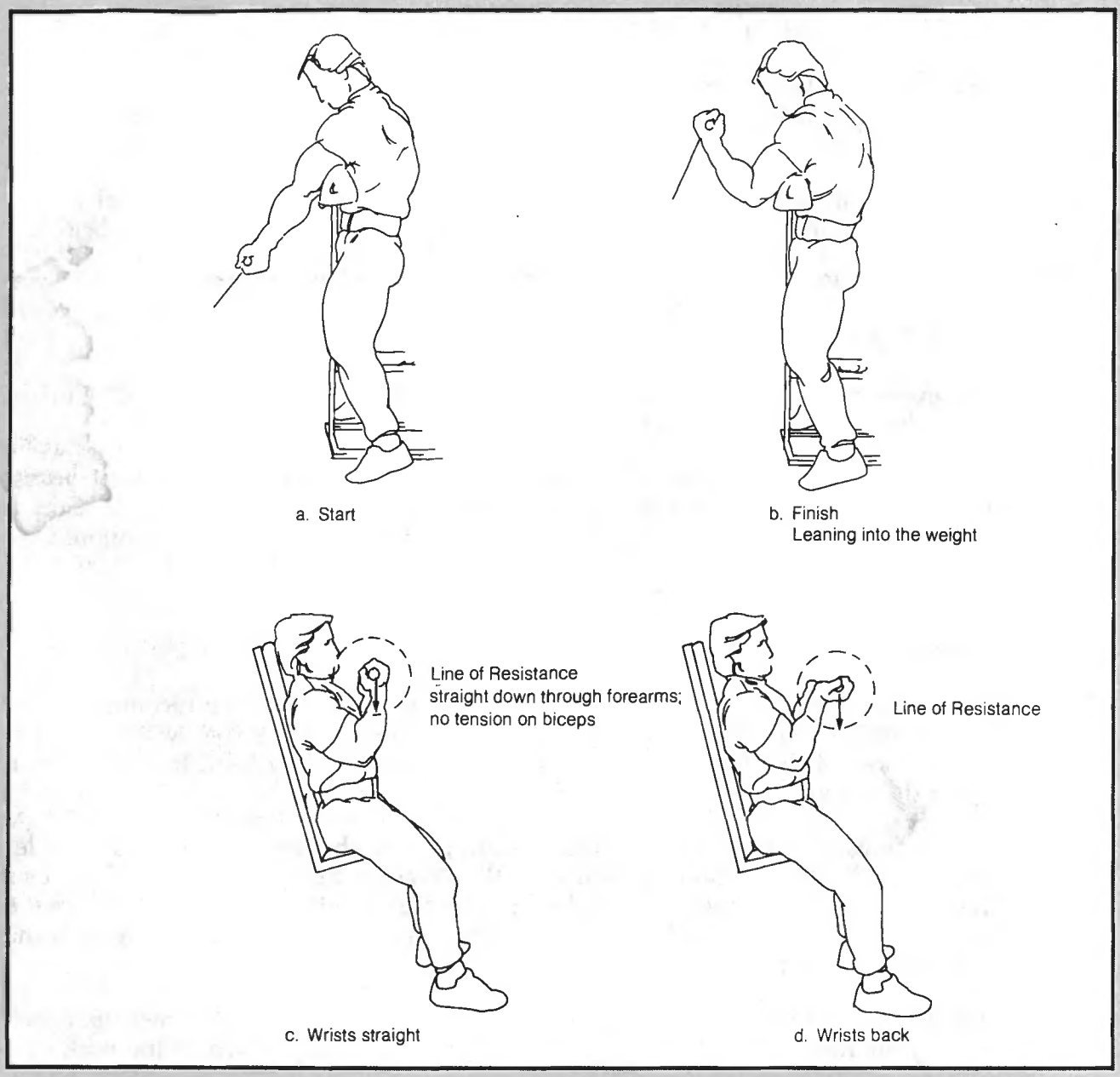


Fig. 5-37

* * *

We mentioned the bicep has two functions: flexing the elbow/shoulder and supinating the hand. To promote functional strength, and to develop massive, powerful biceps, you must do exercises that involve both actions. This means **at least some of your bicep exercises *must employ dumbells*—since it's impossible to supinate while holding a barbell**.

One of the best supination exercises is called just that—Standing Supinated Dumbell Curls. The fine points of form that apply here apply to all supinated curls, including Seated Alternate Supinated Dumbell Curls and Concentration Curls.

* * *

STANDING SUPINATED DUMBELL CURLS

prime mover: biceps, brachialis
synergists: deltoids, spinal erectors

Standard Technique

Stand with a dumbell in each hand, arms at your sides, palms facing back. Starting with one arm, simultaneously curl the weight and rotate your forearm. By the peak of the motion, your palm should be facing up. Lower, reversing the rotation, and repeat with your other arm. Alternate arms for a total of 6-8 reps each.

Optimized Technique

Begin with a dumbell in each hand, palms facing back. You can increase your stability and decrease general strain during this exercise by performing the movement leaning against a bench with your knees slightly bent (see Fig 5-38).

Think of the exercise as a combination of two movements that must be smoothly integrated.

First, supination of the forearm. This is simply rotating your forearm so your palm, which begins facing backward, ends up facing forward.

Second, a curl. Proper curling form is *not* obvious, nor is it what the body does naturally if given a chance. The natural tendency with any exercise is to *do as little work as possible.* When doing curls, for example, your body adjusts to the position of greatest mechanical advantage, taking as much strain off your biceps as possible—not at all what you need to develop powerful arms!

To maximize the work done by the biceps during any curl, and maximize development, you must:

(1) make sure your elbow and arm remain in the Ideal Plane throughout the movement (the vertical plane perpendicular to your body). Take a look at the "wrong" posture in Fig. 5-38k. Notice how the elbow is moving away the body. This takes most of the strain off the biceps and puts a possibly damaging stress on the elbow!

(2) keep your elbow slightly in front of you during the curl. The natural tendency is to let the elbow move next to the body—or worse yet, behind the body—as you raise the weight. Once again, this takes the strain off the biceps.

Specifically, letting the elbows drift back shortens the path the weight travels during the exercise (shorter path, less work, less growth). It also allows the deltoids to take over for the biceps during much of the curl: the rear delts help as you drop the elbow back; the front delts help as you bring your elbow forward to complete the movement.

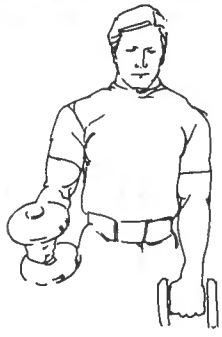
When performing a supinated curl, both the supination of the forearm and the curling motion should occur simultaneously. The supination **should not** happen all at once. Try to rotate the forearm smoothly throughout the entire curling motion. (A common error is to do the entire supination at the beginning of the movement.) Remember to bring your elbow slightly forward as you do the curl—not back or to the side. Keeping the elbow in front of you ensures maximum action of the long head of the bicep, which flexes the shoulder as well as the elbow.

As with other curling motions, lean into the curl at the top to keep tension on the biceps.

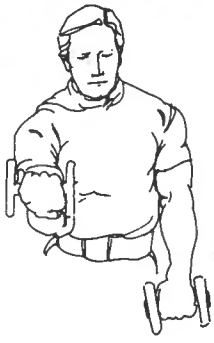
On the way down, it's important to exactly *reverse* the movement performed on the way up. Keep those forearms in the Ideal Plane. Don't let your elbows drift from their position slightly in front of you. Much of the benefit of any exercise comes from returning to the starting position. **You throw that benefit away if your form is sloppy when lowering the weight.**

correct

a. Start — front view



c. Position 2 — front view



e. Position 3 — front view

g. Finish — front view

b. Start — side view

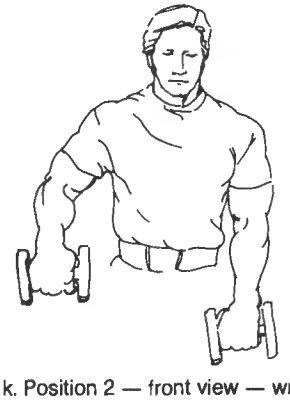
d. Position 2 — side view

f. Position 3 — side view

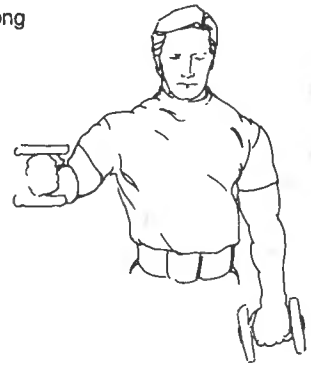
h. Finish — side view

wrong

i. Start — front view



k. Position 2 — front view — wrong!



m. Position 3 — front view — wrong!

o. Finish — front view

j. Start — side view

l. Position 2 — side view — wrong!

n. Position 3 — side view — wrong!

p. Finish — side view

Fig. 5-38

SEATED SUPINATED DUMBELL CURLS

prime mover: biceps, brachialis
synergists: deltoids

When placed late in a bicep routine, this exercise isolates the brachialis as well as the short head of the bicep. Also, it involves a different upper arm angle from any of the bicep exercises described above and thus has a different resistance curve. So combining it with any of those exercises is synergistic.

Standard Technique

Sit on the edge of a bench with your legs spread. Rest the back of your right arm against the inside of your right thigh. Hold a dumbell in your right hand, right arm extended, palm facing your right leg. Simultaneously curl the weight toward your right shoulder and rotate your forearm. By the peak of the motion, your palm should be facing up. Lower the weight, reversing the rotation, and repeat for a total of 6 to 8 reps. Repeat with your left arm.

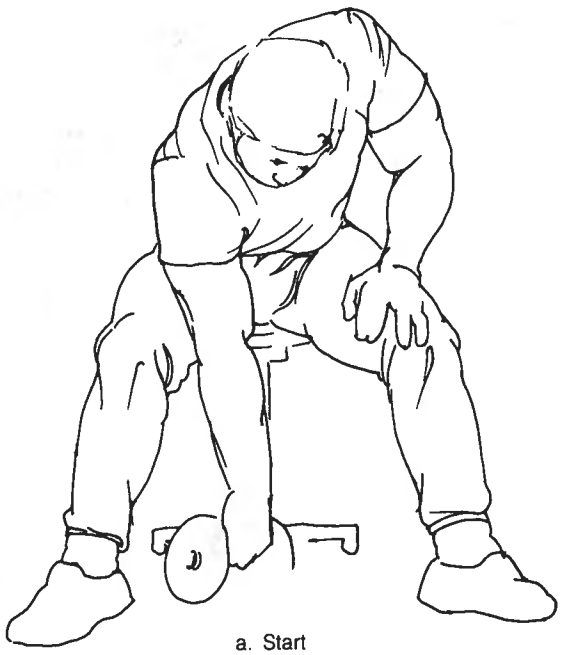
Optimized Technique

Most of the guidelines for Standing Supinated Dumbell Curls apply here.

Once again, two movements—supination of the forearm and bending the elbow—must be smoothly integrated.

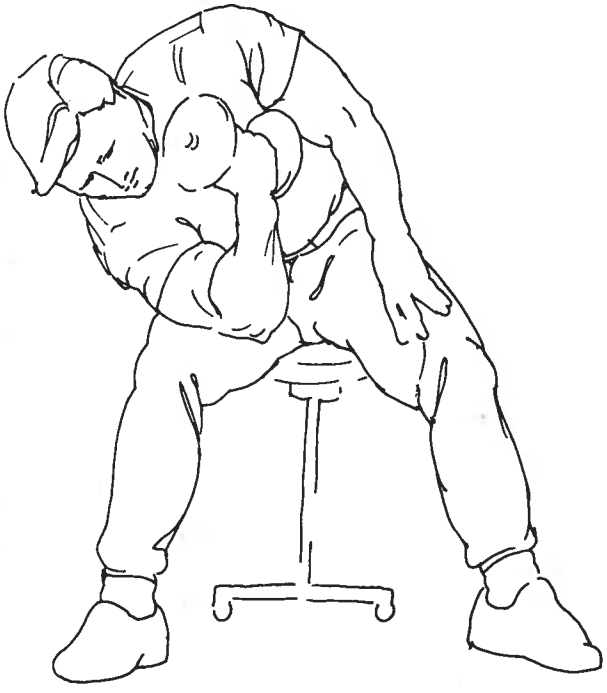
Also, your elbow and arm **must** remain in the Ideal Plane throughout the movement. There is a strong tendency for the elbow to ride in toward the groin as you curl the weight (see "wrong" illustration in Fig. 5-39 below). **This takes the stress off the biceps and puts a possibly damaging strain on the elbow.**

Do not *lean back* to cheat the weight up. This changes your upper arm angle, engaging the standard bicep exercise resistance curve eliminating the prime benefit of this exercise. If you need help to make it through your reps, push in against your arm with your leg, or use your other hand to provide forced reps.

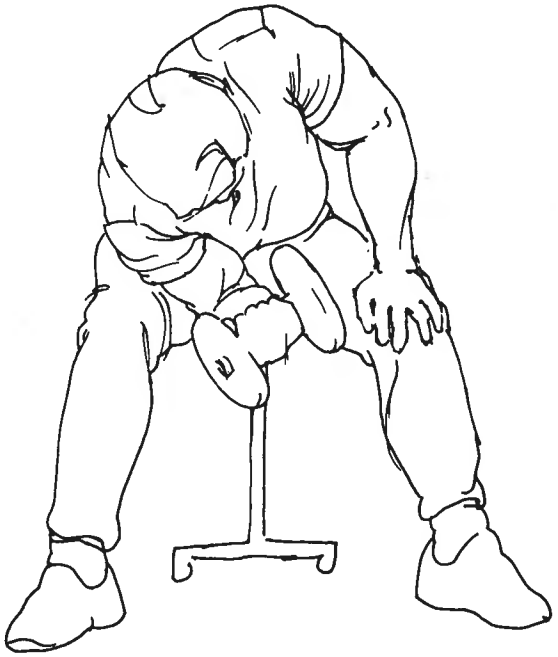


a. Start

b. Finish



c. Wrong — leaning back



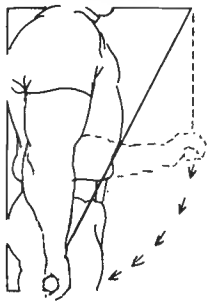
d. Wrong — elbow in toward groin

Fig. 5-39

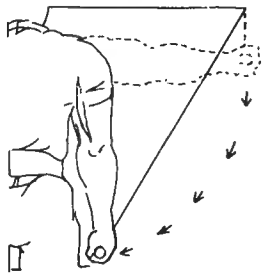
TRICEPS

The tricep is a straight muscle with three heads—long head, lateral head, and medial head. All three *extend* (straighten) the elbow. The long head also *extends* and *adducts* the shoulder. (In other words, it moves the upper arm straight back and in towards the side.)

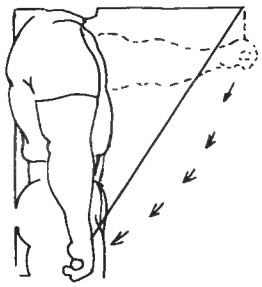
"Long", "lateral", and "medial" are probably not the terms you are used to hearing and using to describe the parts of the triceps. In the gym, the lateral head is refered to as the *outer triceps* since it's on the outside of the arm, and *both* the medial head and the long head are referred to as the *inner triceps* since they're on the inside of the arm.



straightening elbow



adducting shoulder



extending shoulder

MUSCLE		FUNCTION
"outer" tricep	lateral head	straightens elbow
"inner" tricep	long head	straightens elbow adducts shoulder extends shoulder
	medial head	straightens elbow

Fig. 5-40

LYING FRENCH PRESS

prime mover: triceps
synergists: lats, serratus anterior

Standard Technique

Lie on a bench with a barbell across your thighs. Grab the barbell with a narrow, palms-down grip, and kick your legs back to get the bar into position above your head. (This technique is only necessary once the weights get heavy.) Keeping your upper arms stationary, bend at the elbows and lower the bar to your forehead. Press the bar back up and repeat for a total of 6-8 reps.

Optimized Technique

Position yourself so the base of your head is against the end of a flat bench (in other words, so most of your head is off the bench). This will prevent you from "bridging"† during the exercise.

Also, bend your knees and hook your feet under the end of the bench (see Fig. 5-41a). Your abdominals keep your lower back down against the bench. Bringing your feet up gives the abs better leverage and tilts your pelvis in a way that also decreases the tendency to arch.

In starting and ending position, your arms should not be straight up and down. They should be inclined backward slightly toward your head. The angle keeps tension on the triceps throughout the entire exercise, including the "rests" in between reps.

Starting in this position, lower the bar to your forehead, keeping your forearms parallel to each other and your upper arms stationary (Ideal Plane). Don't allow the elbows to drift apart. Non-parallel forearms greatly decrease the effectiveness of the exercise and increase the strain on your elbows. (If you have trouble keeping your arms parallel, try slipping a belt around your elbows to hold your arms in position.)

Press the bar back up to the inclined position. Concentrate on keeping your upper arms parallel. Repeat for 6-8 reps.

†"Bridging" is a wrestling term for lying on your back, then arching up so only the top of your head and bottoms of your feet are touching the ground.

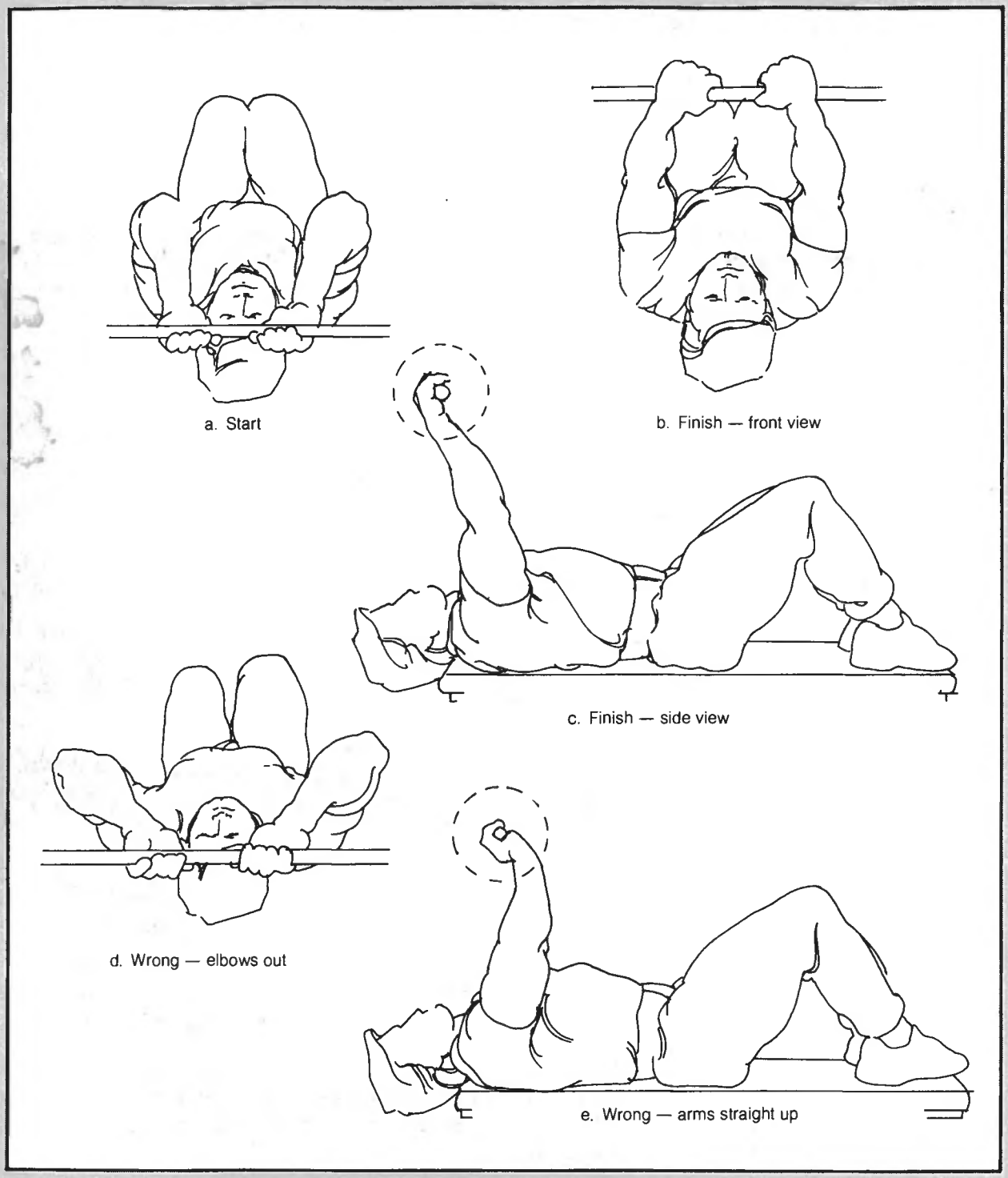


Fig. 5-41

This exercise lends itself well to use with forced reps. Have your partner stand behind you and slow down the bar as it approaches your head, take the weight for the split second as you change direction from down to up, and then help you get it started back up. Employing forced reps like this will allow you to use heavier weights and spare your elbows much of the potentially injurious stress.

TRICEP PRESS-DOWNS

prime mover: triceps
synergists: lats, abs, serratus anterior

Standard Technique

Take a shoulder-width grip on a lat pull-down bar. Using as little body momentum as possible, press down until your arms are extended straight—your elbows should hardly move. Then let the bar travel slowly up; again, your elbows should hardly move. Repeat for a total of 6-8 reps.

Optimized Technique

This exercise can be focused on either the lateral or long/medial heads of the triceps.

Long Head/Medial Head ("inner" triceps) —

Remember, the Long Head of the Triceps is not only responsible for straightening the elbow. It is also involved in extending and adducting the arm at the shoulder (see illustration on page 84).

To focus on the inner triceps, use a straight or slightly bent bar at the end of the lat machine cable.

A straight bar forces the wrists into full *pronation* (palms down). When you do a Tricep Press-Down with wrists pronated, your arms will want to move out from your sides. Countering this tendency calls on the adducting function of the long head of the triceps. This increases the work done by the long head.

Also, the tension generated in the long head from holding in the arms makes it natural to focus on that head, and on the inside of the arms in general.

Begin by standing a foot or so away from the pulley on the lat machine, holding the bar so that the cable angles slightly away from you. Your triceps are strongest about two thirds of the way through the movement, and starting in this position adjusts the resistance curve to more closely match the triceps' strength curve.

Press the bar down **in as wide a semi-circle as possible** (see Fig. 5-42b). Don't let your elbows drift back. This shortens the path the bar travels and decreases the amount of work done, limiting the effectiveness of the exercise.

As you press, keep your wrists straight and your shoulders down. Allowing the wrists to bend back increases the tendency to push *straight down* on the bar, instead of pressing it in a semi-circle. At the bottom of the motion, your elbows should be **one or two inches *in front of you*, and your forearms should be parallel.**

Reverse the motion to raise the bar. Allow the bar to come up until it's even with your chin.

Yes, this is a break with tradition, which dictates that your elbows should remain fixed in place by your sides throughout the movement. However, to maximize the work done by the long head of the triceps, you have to involve its extension-of-the-shoulder function as well as its extension-of-the-elbow function. Allowing the elbows to move forward away from the body during the upswing sets you up to involve the extension-of-the-shoulder function on the way down during the next rep.

Lateral Head ("outer" triceps) —

To focus on the outer triceps, you do the opposite of nearly everything required to focus on the inner triceps.

For starters, you want to *minimize* forearm pronation, so wrap a towel around the cable that connects to the lat bar and stand with an end of the towel in each hand. Basic rule: the closer your palms are to facing one another (the less pronated), the greater the tension on the lateral tricep head, the less tension on the long head.

Next, as you pull down on the towel, keep your elbows fixed in place about two inches in front of your body. Don't let them drift sideways or forward during the exercise.

You still want to describe as wide a semi-circle as possible during the pressing movement. However, on the way up, don't let your elbows move away from your body. The Lateral Head is not involved in extending or adducting the arm.

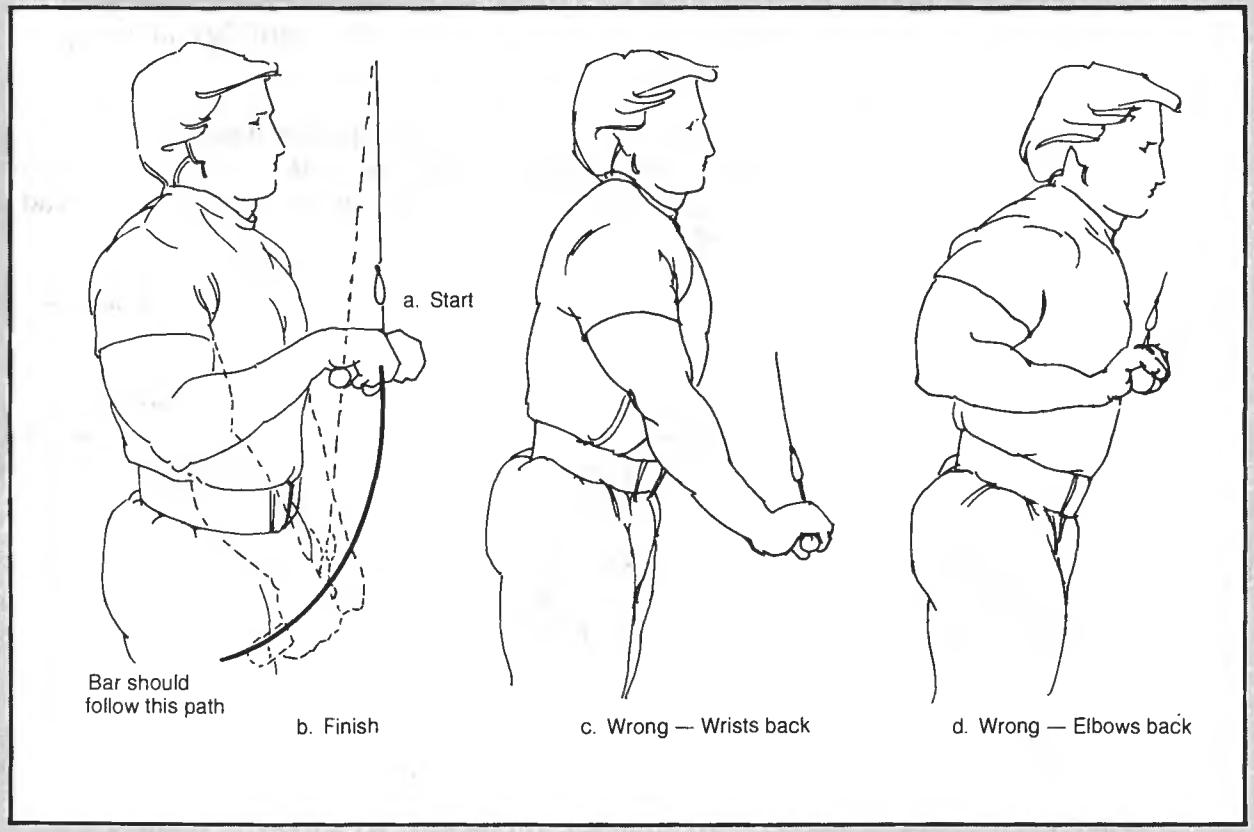


Fig. 5-42

You can increase overall tricep development with this one exercise by doing six sets—three with a straight, or slightly bent bar (to focus on the "inner" triceps), and three with a rope or towel (to focus on the "outer" triceps).

TRICEP BENCH DIPS

prime mover: triceps
synergists: lower pecs, anterior delts, some lats

Standard Technique

With hands behind your back, support yourself on your palms at the end of a supine bench. Elevate your feet on another bench. Bending at the elbows, lower your torso until you feel the stretch in your chest. Push up until your arms are straight. Repeat for 6-8 reps.

Optimized Technique

Hands behind your back, support yourself on your palms at the end of a supine bench. Your hands should be touching; your elbows should be angled outward. Dipping in this position relieves a lot of stress on the elbow and shoulder joints, and also facilitates proper focus.

If possible, arrange yourself so your feet are six to twelve inches higher than your hands. If you work out in a gym, you might put your hands on a bench and your feet on top of the dumbells on a dumbell rack. Bend your knees (and keep them bent throughout the movement).

Lower yourself keeping your back close to the bench. Bend your elbows back and slightly to the sides. Keep your body angled slightly forward throughout the motion.

Press yourself up until your arms are straight. Your torso should move backward as well as up. As you near the top, force your upper arms in against your body. This will maximize the stress on triceps.

Repeat for 6 to 8 reps.

(See illustration on next page.)

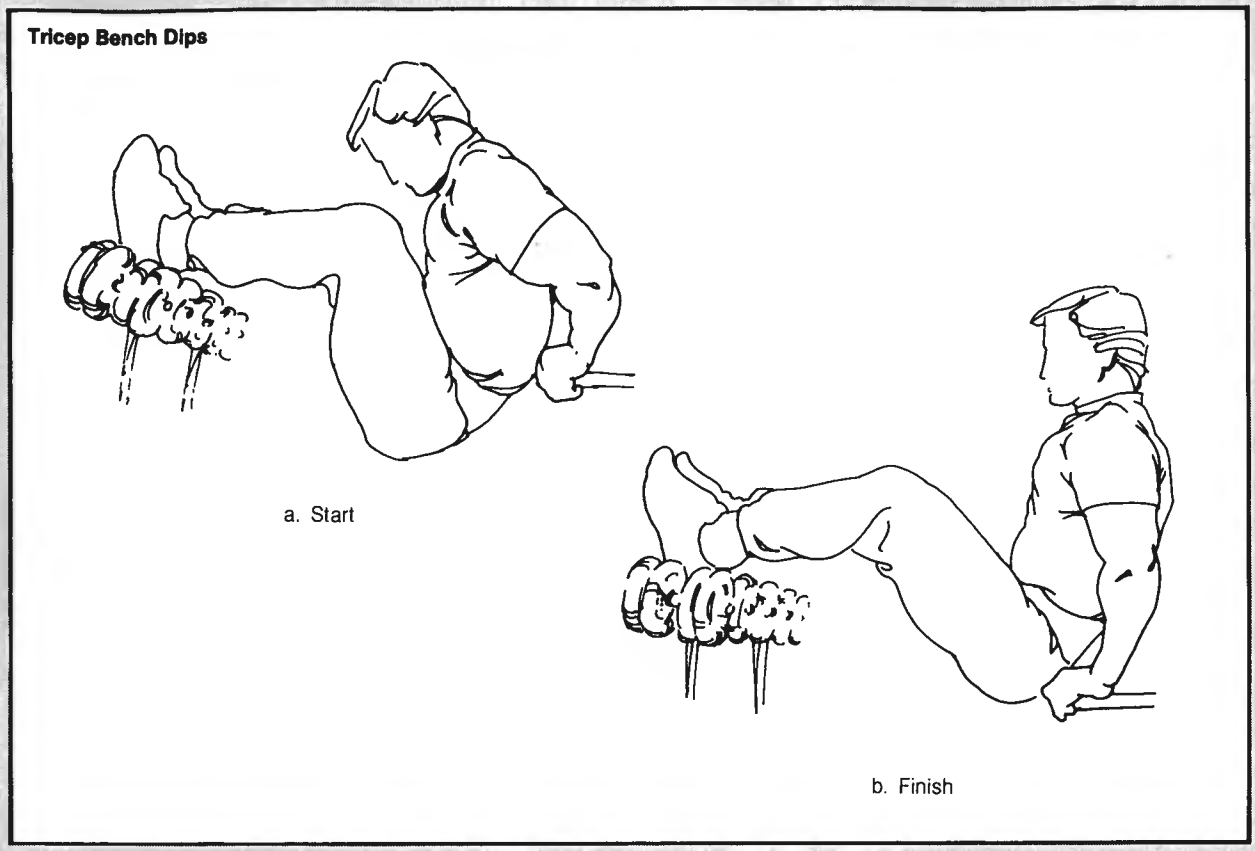


Fig. 5-43

TRICEP BAR DIPS

prime mover: triceps
synergists: anterior delts, lats, lower traps, lower pecs

Standard Technique

Position yourself on dipping bars. Lower yourself until you feel the stretch in your chest, then push back up. Repeat for 6-8 reps.

Optimized Technique

As mentioned earlier, Dips can either focus on the chest or triceps, depending on your form. To focus on the triceps, **keep your head up, your body straight up and down, *and your elbows straight back behind you*.**

If you do the exercise leaning forward with elbows out to the sides, you engage the pecs (which pull the upper arm in and straight across the chest), decreasing the strain on the triceps. The trick here is to eliminate as much contribution by the chest as possible, allowing the strain to be carried by the triceps.

Lower yourself until you feel the stretch in your front shoulders.

Maintaining the upright posture, push yourself back up. Think "inner triceps." **Pull your arms in against your sides as you push up.** This activates the adducting function of the long head of the triceps, increasing tricep work done. It also improves your focus during the exercise.

Repeat for 6-8 reps.

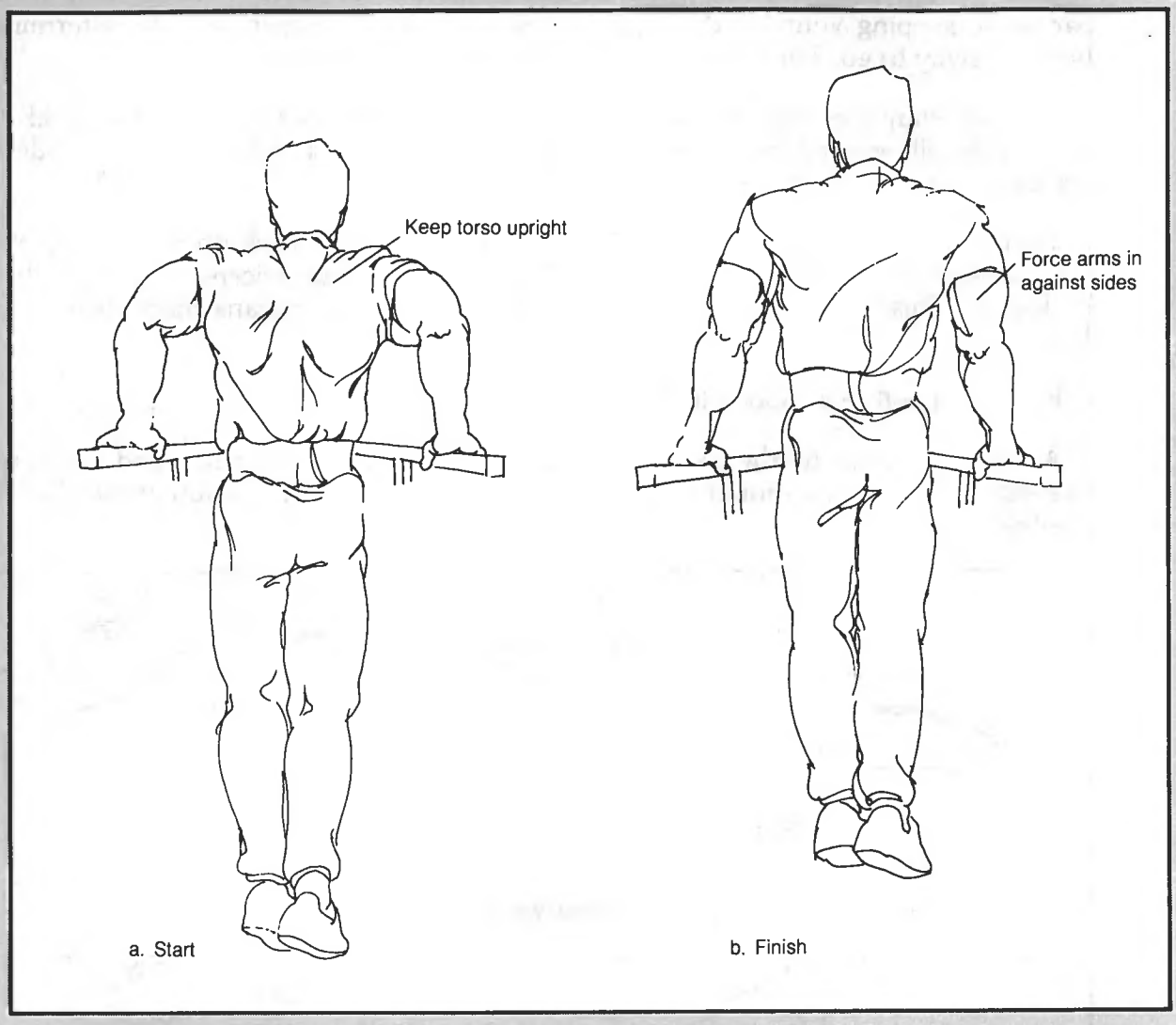


Fig. 5-44

TRICEP PUSH-UPS

prime mover: triceps
synergists: lats

Here's another original Health For Life bodyweight exercise, and it's a killer! It stresses the "inner triceps" (the long and medial heads) as well as the tendonous mass of the triceps just behind the elbow (an area difficult to develop). Take it slowly. This one is hard on the elbows if done improperly. If you've been training less than one year, we recommend you skip Tricep Push-Ups for a while.

Optimized Technique

You will need a fixed bar about 2 feet off the ground (see illustration) strong enough to support your weight. The end of a Paramount or Universal machine Bench Press bar is perfect for this, and even has a rotating cuff to make things easier on your calluses.

Grip the bar palms down, hands as close together as possible. Back away from the bar while keeping your hands in place. You will have to experiment to determine just how far away to go. The farther you go, the harder the exercise.

Keeping your legs together *and your upper arms parallel to each other* (Ideal Plane), bend at the elbows and lower yourself down in a semi-circle until your head is underneath the bar and you can't go any farther.

Then, maintaining the parallel arms, simultaneously push back up and rise up on your toes. Result: your calves are pushing forward while your triceps are trying to push backward. This makes the exercise much harder, and that means more growth in less time.

Repeat for 6-8 reps. (Good luck!)

As you get used to the exercise, keep moving your feet farther and farther back. Eventually, your body should be almost parallel to the floor when you are in the "down" position.

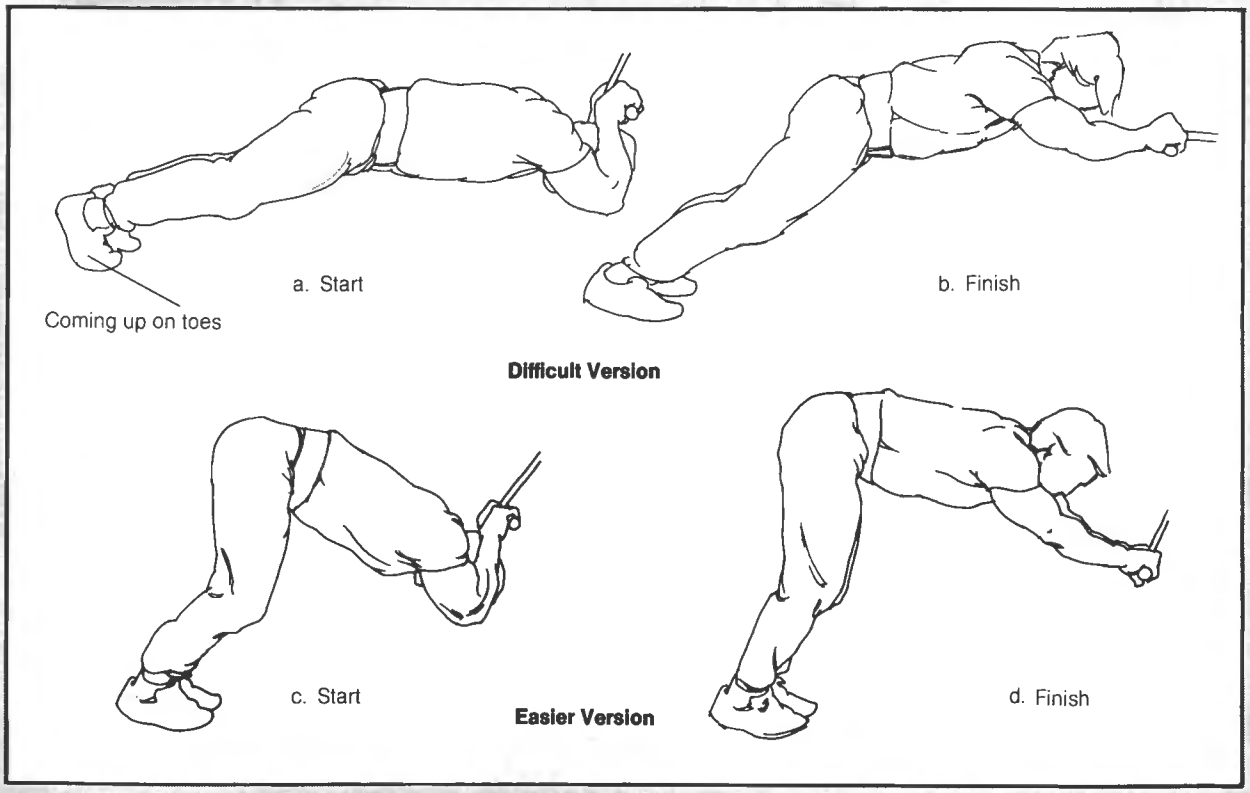


Fig. 5-45

TRICEP KICK-BACKS

prime mover: triceps
synergists: none

This isolation exercise has a resistance curve **opposite** to most other tricep exercises, so it is synergistic (greater gains in less time) when combined with them.

It is only effective when performed at the end of a tricep routine because it involves a somewhat awkward posture that relies heavily on the stabilizing action of the lats and rear delts. As such, the amount of weight you would have to use to adequately stress "fresh" triceps would make the movement difficult—if not impossible—to perform and put severe stress on your elbow and spine.

Standard Technique

Hold a light-weight dumbell (5 to 15 lbs.) in your right hand. Lean forward and support yourself by placing your left hand against a low bench or table. Your torso should be parallel to the floor. Bend your right elbow and position yourself so your right upper arm is along your side and your forearm is hanging straight down toward the floor.

Extend your elbow. Lower and repeat for a total of 6 to 8 reps. Repeat with other arm.

Optimized Technique

The most important part of this exercise is **making sure your upper arm remains parallel to your torso throughout the movement.** This means you will have to apply a little extra upward pull with your rear delts both at the beginning and the end of each rep. Otherwise, momentum will pull your elbow down (Fig 5-46c). Allowing your elbow to drift down alters the resistance curve of the exercise, negating the exercise's prime benefit.

Be careful not to overcompensate and draw your elbow up too far. Doing so (Fig. 5-46d) shortens the path the weight travels, decreasing the effectiveness of the exercise.

Begin with the dumbell parallel to your torso (Fig. 5-46a). As you straighten your arm, twist your forearm (pronate) so your palm ends facing upward (Fig. 5-46b). Pronating during Kick-Backs has the same effect as during Tricep Press-Downs—it increases the focus on the "inner" triceps, resulting in greater development. Supinate as you lower the weight to return to the starting position (Fig. 5-46a).

Make sure your arm remains in the Ideal Plane throughout the movement.

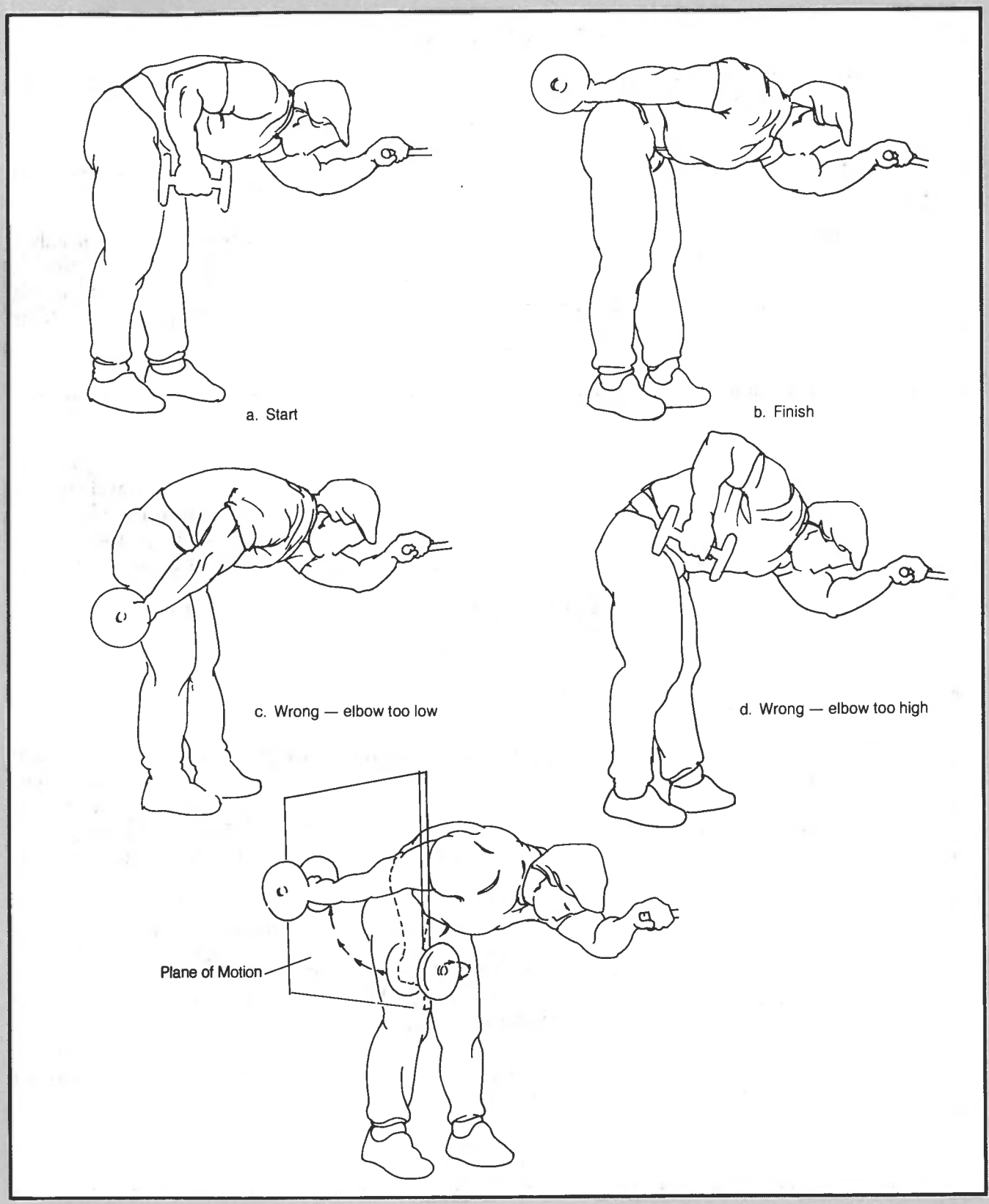

a. Start
b. Finish
c. Wrong — elbow too low
d. Wrong — elbow too high
Plane of Motion

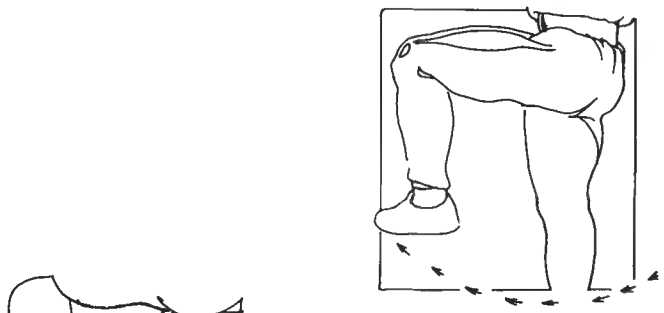
Fig. 5-46

LOWER BODY

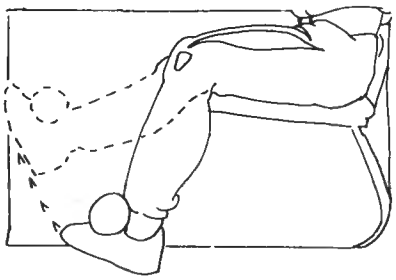
There are three major muscle groups in the lower body we need to consider: the quadriceps, hamstrings, and glutes.† Let's take on each in turn.

Quadriceps

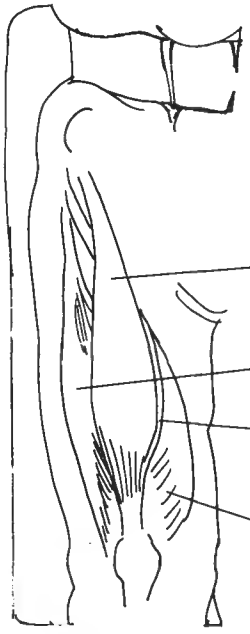
The Quadriceps is a muscle *group* composed of *four separate straight muscles* all having essentially the same line of force. All four act to extend (straighten) the knee. One of the four (rectus femoris) also helps flex (bend) the hip.



Flexing the hip



Extending the knee



MUSCLE	FUNCTION
Rectus Femoris (upper quad)	Bends hip Straightens knee
Vastus Lateralis (outer quad)	Straightens knee
Vastus Intermedialis (behind Rectus Femoris)	Straightens knee
Vastus Medialis (inner quad)	Straightens knee

Fig. 5-47

†Remember, *calves* will be the subject of a future course.

Hamstrings

The terms "Hamstrings" and "Leg Biceps" are used interchangeably in the gym, but they shouldn't be. "Hamstrings" refers to the group of muscles responsible for flexing (bending) the knee. Some members of this group also extend (straighten) the hip. Leg Biceps, on the other hand, *is a specific two-headed muscle.* It is *part* of the hamstring group.

There is no need for us to consider the individual muscles constituting the hamstrings. We will be concerned with those muscles as a unit.

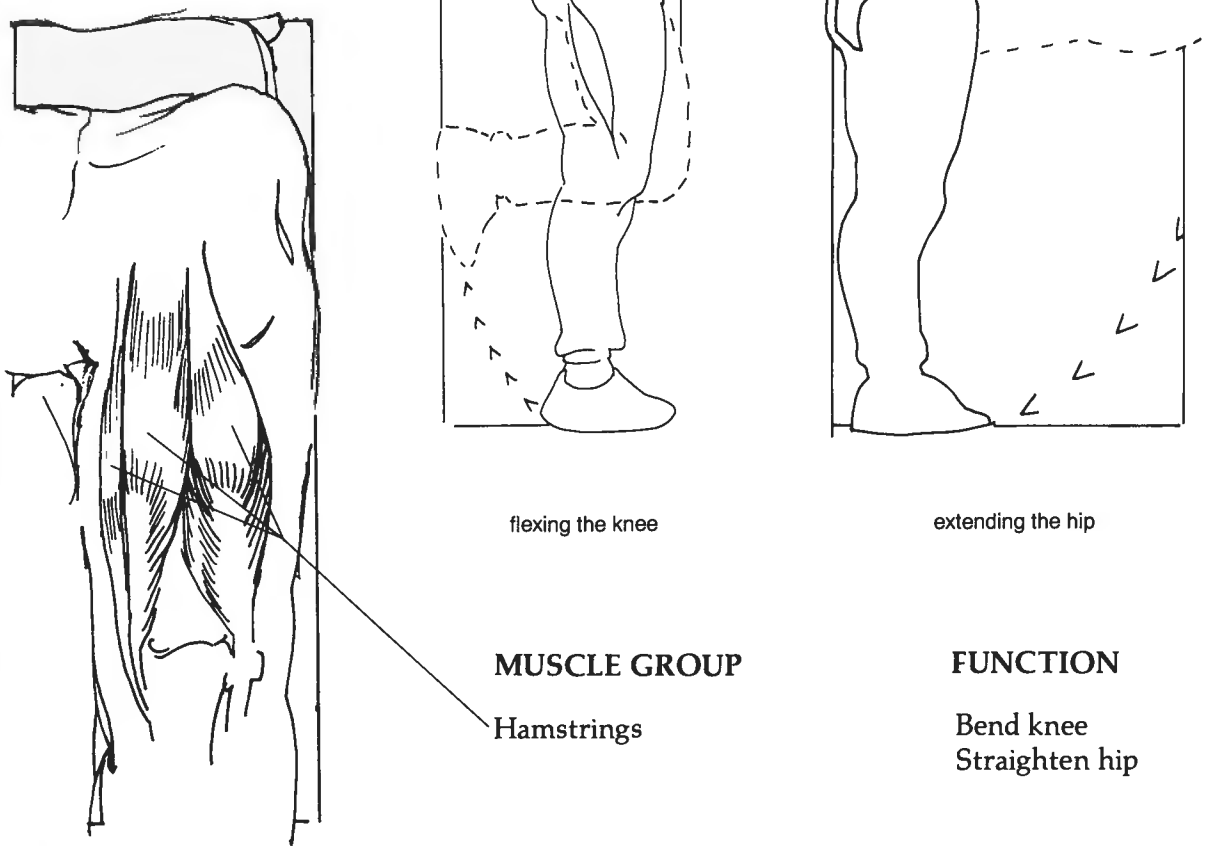


Fig. 5-48

Gluteus Group (and Tensor Fasciae Latae)

The glutes consist of three separate muscles: gluteus maximus, gluteus medius, and gluteus minimus. All act to create motion at the hip joint. Different segments of the glutes lift the thigh forward, lift the thigh out to the side, rotate the leg inward, and rotate the leg outward. Several other smaller muscles act along with the glutes to provide force for these movements. One we mention by name below—the tensor fasciae latae. The tensor fasciae latae forms that bump on the side of your thigh just below your hip bone. It helps lift the thigh out to the side.

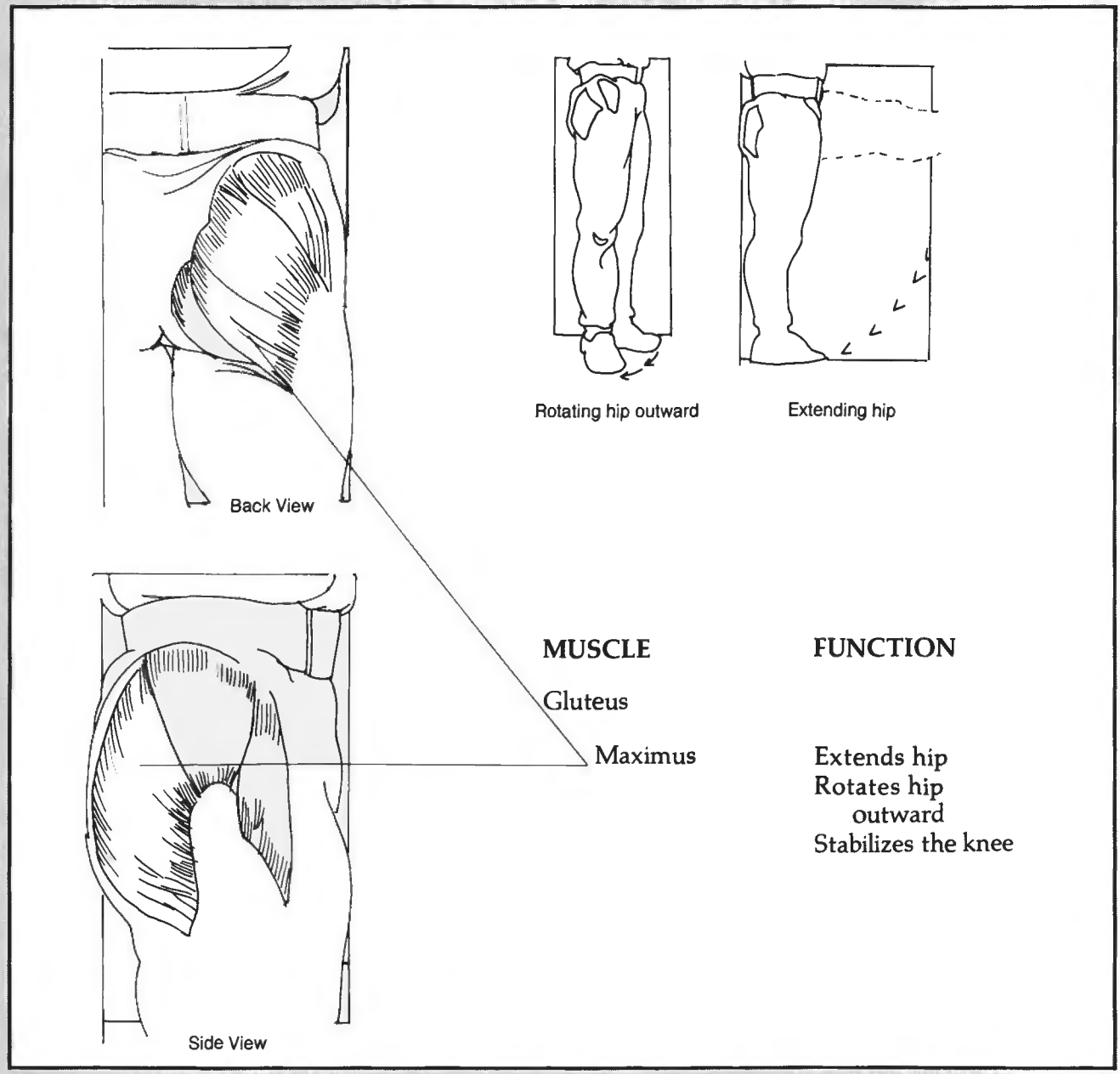
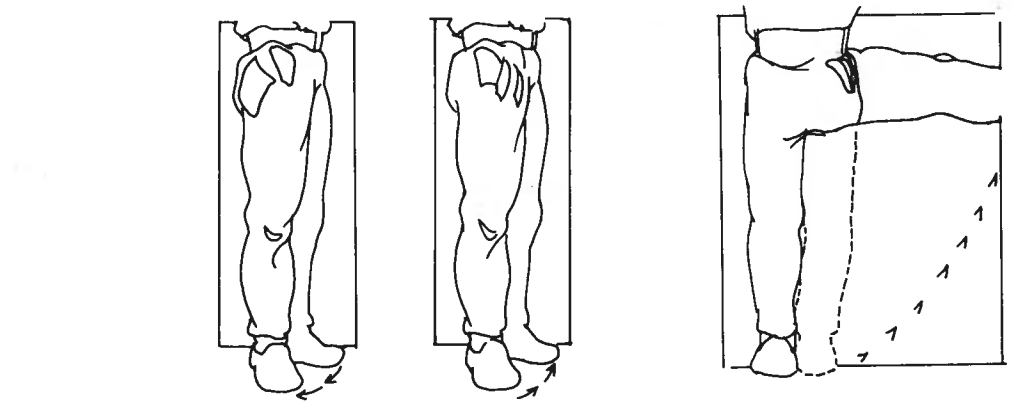
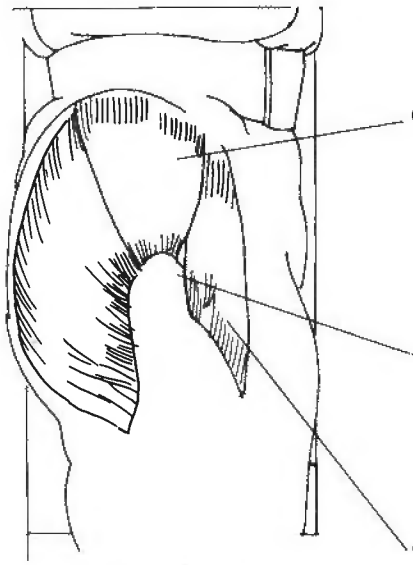


Fig. 5-49





MUSCLE	FUNCTION
Gluteus Medius	Abducts hip Rear portion rotates thigh outward Front portion rotates thigh inward
Minimus (beneath medius)	Abducts hip Rotates thigh outward
Tensor Fasciae Latae	Abducts hip

Fig. 5-49

Before detailing the exercises, let's take a look at two special features of functional strength thigh exercises. The first is how all inclusive they are.

For most upper body parts, functional strength exercises involve the prime mover and maybe one or two synergists. The Bench Press, for instance, employs the pectorals as prime mover, and the triceps and anterior deltoid as synergists.

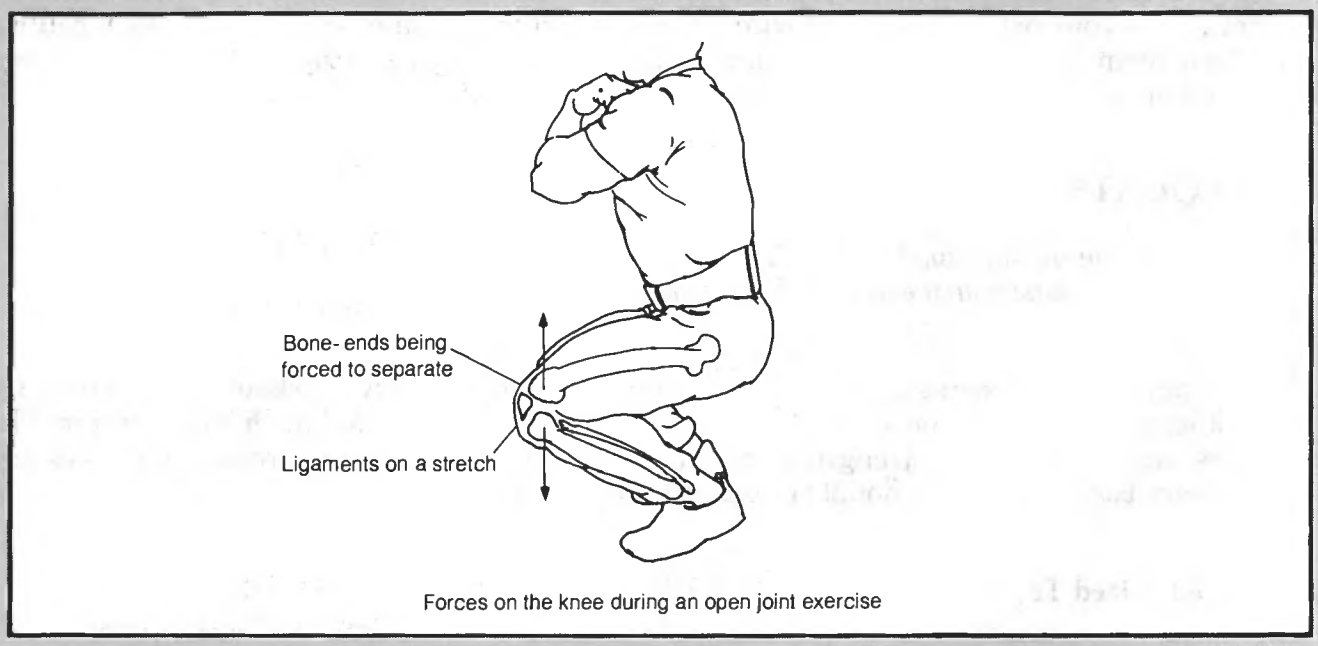
But for the lower body, most functional strength exercises involve *many* muscles acting together as prime mover and synergists.

Take Squats, for example. Here, the quadriceps, glutes, spinal erectors and, to some extent, the hamstrings all act together as prime mover/synergists. It's difficult to say which muscles are performing which functions, because all make such major contributions to the movement.

If time is extremely limited, Squats can actually function as a one-exercise lower body workout, especially if you are just using weights as supplemental training for another sport.

The second special feature is an important mechanical difference between lower body functional strength exercises and lower body isolation exercises.

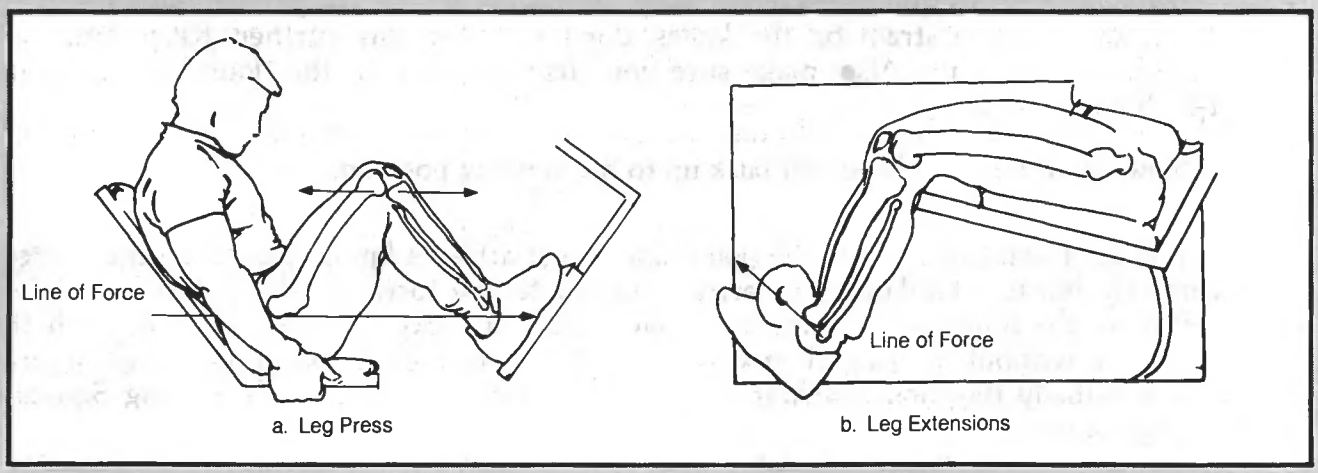
Most lower body functional strength exercises (Squats, Lying Leg Press, Seated Leg Press, Front Squats) are what's known as **open joint** movements, so-called because when you do them, your knee joints literally open up—the bone ends separate.



Forces on the knee during an open joint exercise

Fig. 5-50

An exercise is "open joint" if it requires force to be applied along the line through your hip and ankle. That's in contrast to an isolation exercise like Leg Extensions where the force is applied perpendicular to the leg.



a. Leg Press

b. Leg Extensions

Fig. 5-51

If you go to the end of your range of motion during an open joint movement—for instance, dropping all the way down when doing Squats—you put your knee ligaments on a stretch. In and of itself, this is not so bad. But any additional stress on those ligaments—like bouncing at the bottom of the squat to get back up—can stretch those ligaments out, rendering your knee permanently unstable. That's the basis for the recommendation not to bounce at the bottom of a Squat. It's also the reason some old football training exercises like the Duck Walk have been put out to pasture.

If you have knee problems, you may want to omit joint exercises from your workout (check with your orthopedist for advice). You can still devise an effective lower body routine without them. In the Program Section, we include such a routine, designed to minimize stress on the knees.

SQUATS

prime mover: quadriceps, glutes
synergists: spinal erectors, hamstrings

Squats is the cornerstone of the bodybuilder's lower body workout. Assuming your knees are up to it, no other lower body exercise packs on as much mass or provides as rapid increases in strength as Squats does. Since the exercise stresses the knees and lower back, though, be doubly careful about your form!

Optimized Technique

If possible, use a squat rack to avoid having to clean and jerk the bar over your head.

Get underneath the bar and lift it off the rack. Step back, and stand with feet spread slightly wider than shoulder width, back straight, and head up. If you want, you can place a one inch piece of wood under your heels for balance.

Bend your knees and lower your body until your thighs are parallel with the floor. To avoid excessive strain on the knees, don't go down any further. Keep your back straight and head up. Also, make sure your feet stay flat on the floor (or against the 1-inch wood block).

Now, smoothly push yourself back up to the starting position.

We don't want to belabor the point since most athletes know how to do the exercise correctly, but the standard Squat error is leaning too far forward. This puts a tremendous strain on the lumbo-sacral junction (lower back). A lucky few can get away with this for years without injuring themselves. But it is not a good idea! Lower back injuries are potentially the most debilitating of all, and bending forward while doing Squats is asking for one.

Fig. 5-52

HACK SQUATS

prime mover: quads, also gluteus, hamstrings
synergists: gluteus, hamstrings, spinal erectors

This exercise puts less strain on the lower back than regular Squats, and, in the modified form we will describe shortly, can be used as a mass builder even by someone with knee problems.

Standard Technique

Stand on a hack machine with your back against the pad. (The version of this exercise done facing forward into the machine primarily affects the glutes.) Bend at the knees keeping your back against the pad and lower slowly into a full squat. Press back up. Repeat for 6-8 reps.

Optimized (Regular, *not Knee-Sparing*) Technique

Stand on a hack machine with your upper and mid back against the pad. Your pelvis should be rocked forward so your hips **are not** against the pad.

Thrusting the pelvis forward shifts the emphasis of the exercise onto the quads in two ways: First, it puts the quads on a slight stretch, a condition that forces any muscle to work harder. Second, it takes the glutes out of Ideal Orientation. This decreases the glutes' ability to contribute as synergists during the top part of the movement.

Lower yourself slowly into a full squat. Do not let the pelvis rock back.

Slowly push yourself up (still keeping the pelvis forward). Don't bounce! Repeat for 6-8 reps.

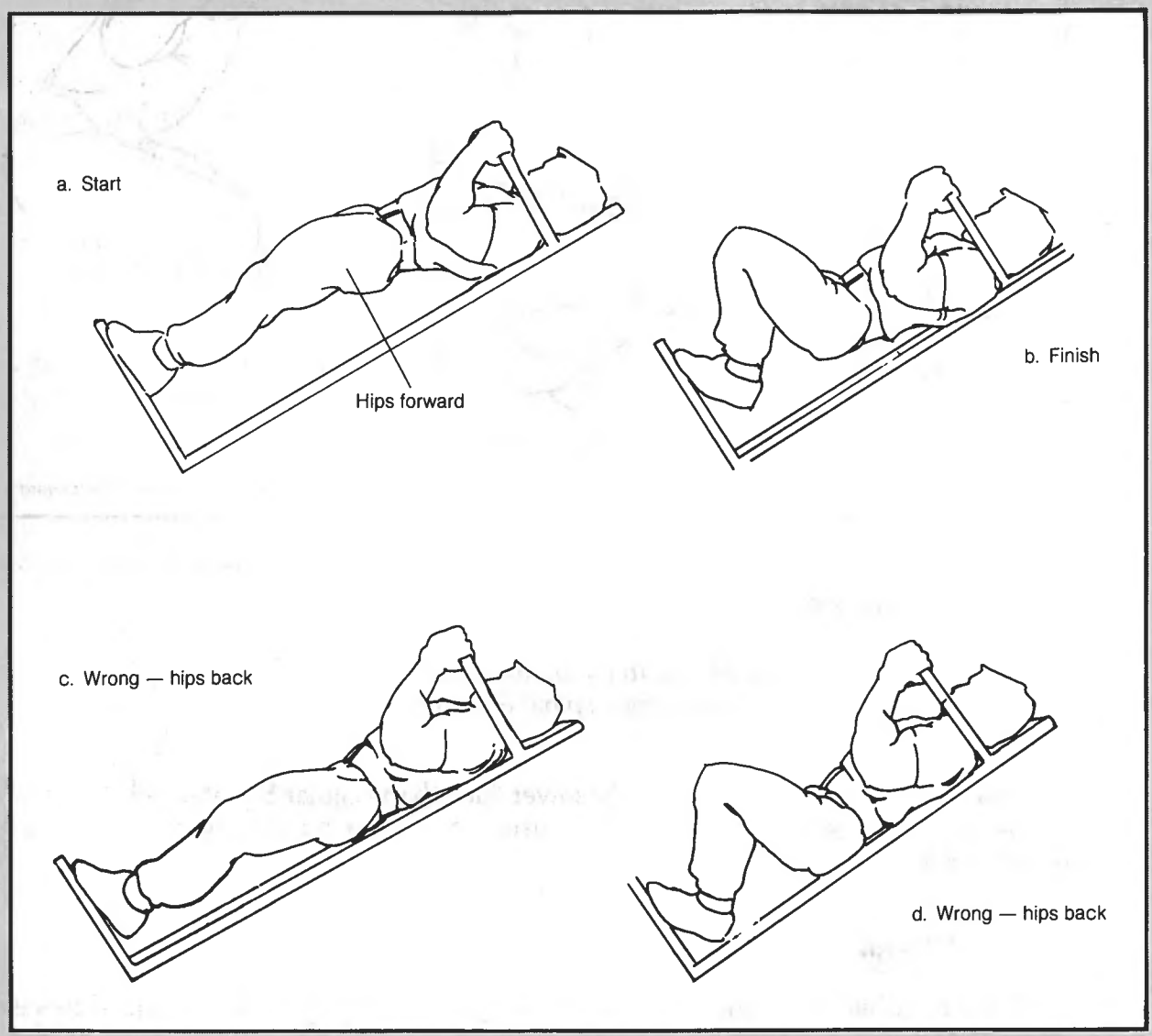


Fig. 5-53

1/4 HACK SQUATS

prime mover: quadriceps
synergists: glutes

Optimized (*Knee-Sparing*) Technique

Many bodybuilders and athletes who want increased leg strength and/or mass can't do the standard quadricep mass-builder exercises because of knee problems. Squats are out; so are regular Hack Squats; even running stairs can be a problem.

If you have trouble with your knees, but want to build up your thighs, try 1/4 Hack Squats. The first quarter of a Hack Squat concentrates heavily on the quads. Below that point, the focus is diffused over the quads, glutes, and hamstrings. That first quarter calls for only about a 30° angle bend in the knees.

Many athletes with chronic knee injuries can sustain 30° of flexion without incidence of pain or further injury. This is especially true in cases of *minor* cartilage damage and over-stretched—but not torn—ligaments. If you have any doubts about your condition, ask your orthopedist **before trying the exercise**.

Begin the modified version like the regular version: Stand on a hack machine with your upper and mid back against the pad. Your pelvis should be rocked forward so your hips **are not** against the pad.

Lower yourself slowly until your knees have bent about 30°. No further! Do not let the pelvis rock back. Focus on your quads; feel for the burn, especially in the upper and outer quads (rectus femoris and vastus lateralis).

Then, slowly push yourself back up, still keeping the pelvis forward. Don't bounce! Repeat for 6-8 reps.

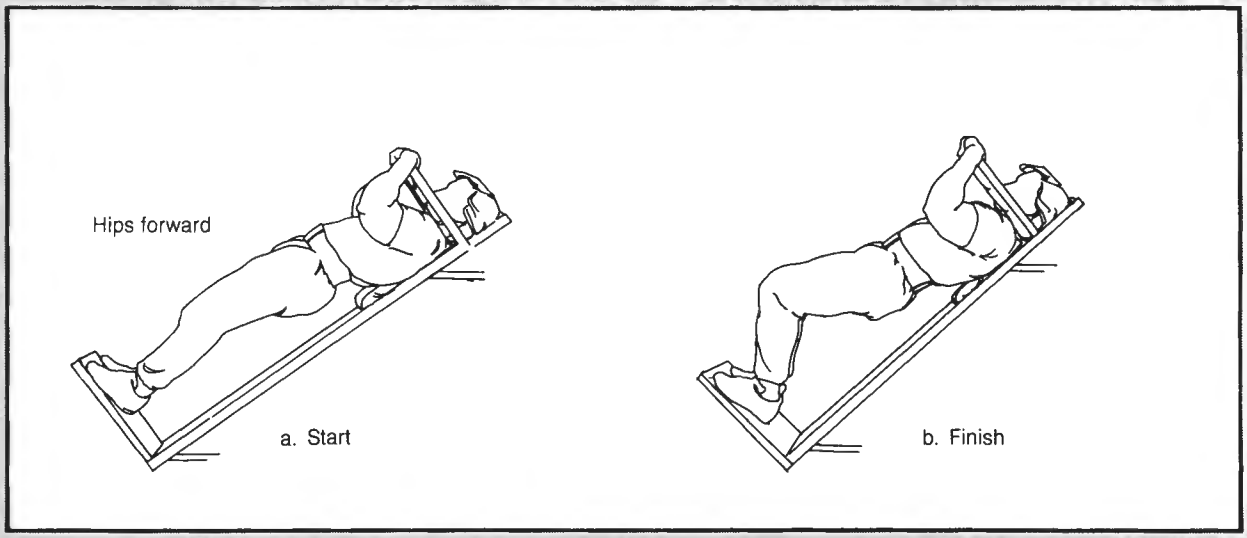


Fig. 5-54

You can do a version of this exercise even if you don't have access to a Hack Squat machine. You need a rope and any bar above head level. A chinning bar works fine; so does the top of a Universal Machine.

Throw the rope over the bar. Step back five to eight feet. Hold one end of the rope in each hand, thrust your pelvis forward, and lean back, rocking up onto the balls of your feet. Bend only at the knees.

Feeling for the tension in your quads, push yourself back up. Repeat for 10-12 reps.

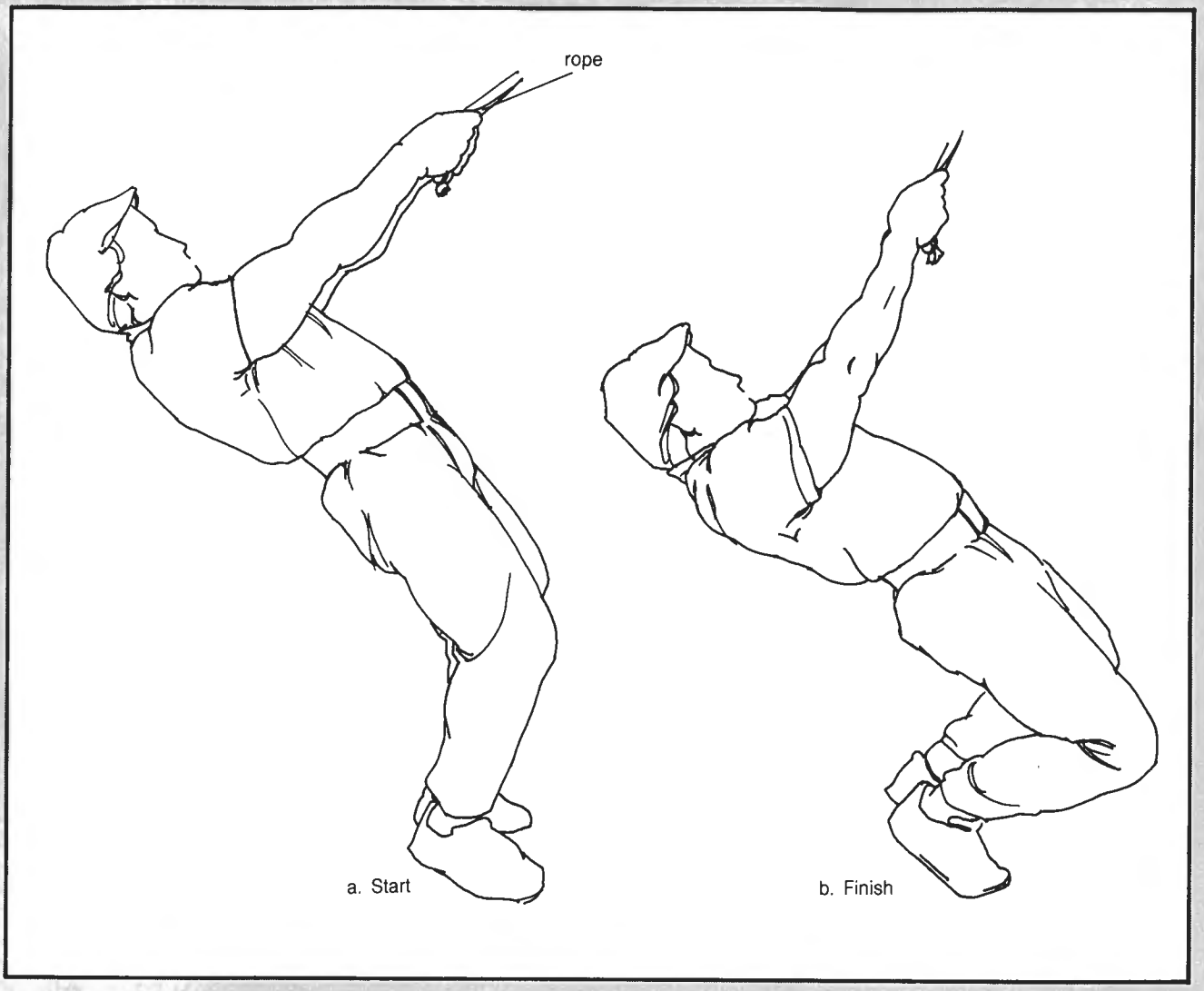


Fig. 5-55

We move now from the general workout of lower body functional strength exercises to the focused attack of isolation work. Below, we will detail a secret for shifting the emphasis of Leg Extensions from the inner to the outer quads. Also, we will take a look at typical problems with the way Leg Curls are performed.

LEG EXTENSIONS

prime mover: quadriceps
synergists: none

Standard Technique

Sit on a leg extension machine. Hold yourself down by grabbing the base of the seat (or handles if they are provided) and slowly extend your legs until straight. Hold for a second. Then lower and repeat for a total of 6-8 reps.

Optimized Technique

There is a virtually unknown technique you can use during Leg Extensions that shifts the emphasis from the inner to the outer quadriceps. Doing three to four sets for the outer quads followed by the same number for the inners will really cut up your thighs fast! It will also ensure balanced development† around your knees, decreasing risk of injury, increasing functional strength, and improving the symmetry of your legs.

Outer Quads—

Sit on a leg extension machine, **leaning back**. Point your toes and extend your legs until they're straight. As you lift, apply a *slight* amount of pressure as if you were trying to separate your legs. Remember to keep your toes pointed throughout the motion. The combination of pointed toes and slight outward pressure will shift the emphasis to the outer quads.

Hold for a second at peak, then lower and repeat for 6-8 reps. **Keep the toes pointed!**

Inner Quads—

Sit on a leg extension machine, **leaning forward.** Pull your toes back, and roll your ankles in **slightly** (supinate at the ankles). Keep your feet in this position throughout the lift. Extend your legs, leaning forward into the motion as you do. Feel for the tension along the insides of your legs.

†"Balanced development" usually refers to promoting strength in both muscles of a muscle group pair at a joint. At the knee, you have another pair to consider—the inner and outer quadriceps. Unequal development of those two muscles can lead to increased joint stress, just like unequal development of the quadricep/hamstrings pair.

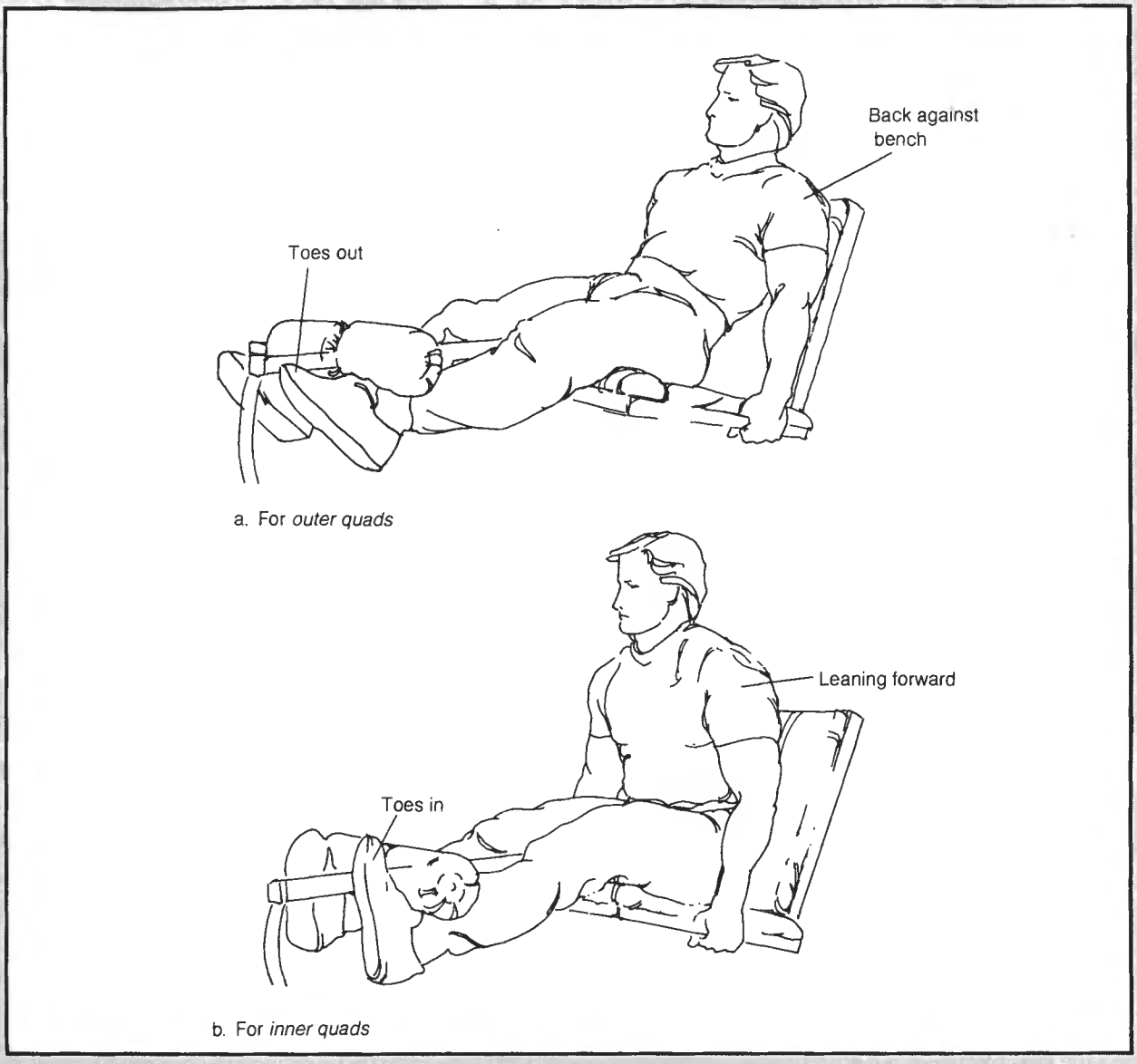


Fig. 5-56

The Interdependency Principle determines which variation of Leg Extensions to do first:

Both the inner and outer quadriceps are involved in both Leg Extension variations. However— When the outer quads are functioning as prime mover, they rely heavily on the inner quads as synergists. When the inner quads are functioning as prime mover, they **don't** rely heavily on the outers as synergists.

To work **outer quadriceps,** you need **outer quadriceps *and* inner quadriceps**

To work **inner quadriceps,** you mainly need **inner quadriceps.**

As a result, if you tire the inner quads first, they become the limiting factor in outer quad work. So you should do the outer quad variation *first.*

LEG CURLS

prime mover: leg biceps (hamstrings)
synergists: glutes, spinal erectors, gastrocs

Leg Curls are a charter member of the group of exercises usually done incorrectly—probably because the right and wrong ways of doing the exercise look so similar. Subtle differences in the way you approach the exercise on a muscular level make all the difference in the world.

Standard Technique

Lie face down on a Leg Curl machine. Curl up the weight as high as possible, preferably until it touches your buttocks. Keep your buttocks down during the exercise. Lower and repeat for a total 6-8 reps.

Optimized Technique

First, a note about the curl machine itself:

If it is possible to adjust the length of the bar between the hinge and the pads that press against the backs of your legs, make sure the pads catch you just above the achilles tendons.

The best machines have an eccentric cam that varies the resistance during the movement. Next best are more standard machines like the Universal that use a pulley, but no eccentric cam. Worst are those that have no weight stack and pulley mechanism, and must be loaded with plates. If you have access to a machine with an eccentric cam, use it!

As far as technique goes...

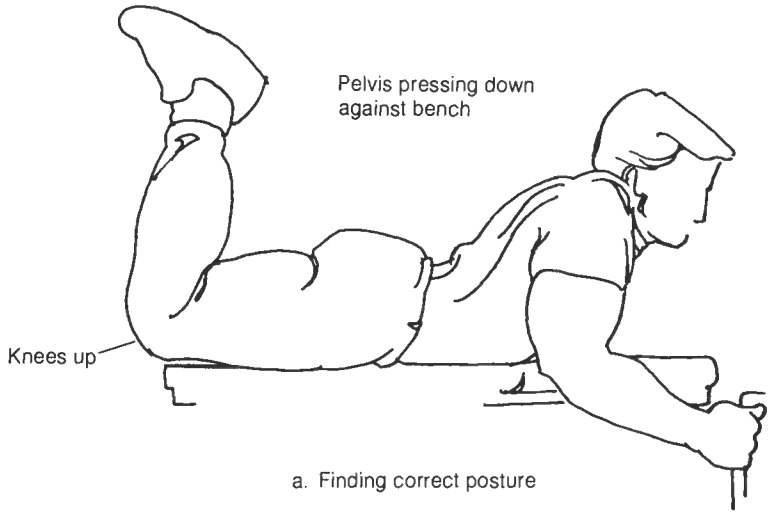
The main problem with this exercise is misinterpreting the instructions, which always contain the phrase: "Keep your buttocks down during the movement." This is taken to mean, "your buttocks will try to come up during the exercise—don't let them." And indeed, if you do the exercise the way your body naturally *wants* to (based on the tendency to do the least amount of work possible), your hips *will* want to rise off the bench as you curl your legs. So it's easy to assume that "keep your buttocks down" means fighting that tendency.

But it doesn't.

It is desirable—and possible—to position yourself so your hips *don't want* to come off the bench during the exercise. In fact, in the proper position, you *can't* raise your hips, because the tension you maintain within your body acts to *push your hips down against the bench.*

Here's a brief exercise to get in touch with this correct posture:

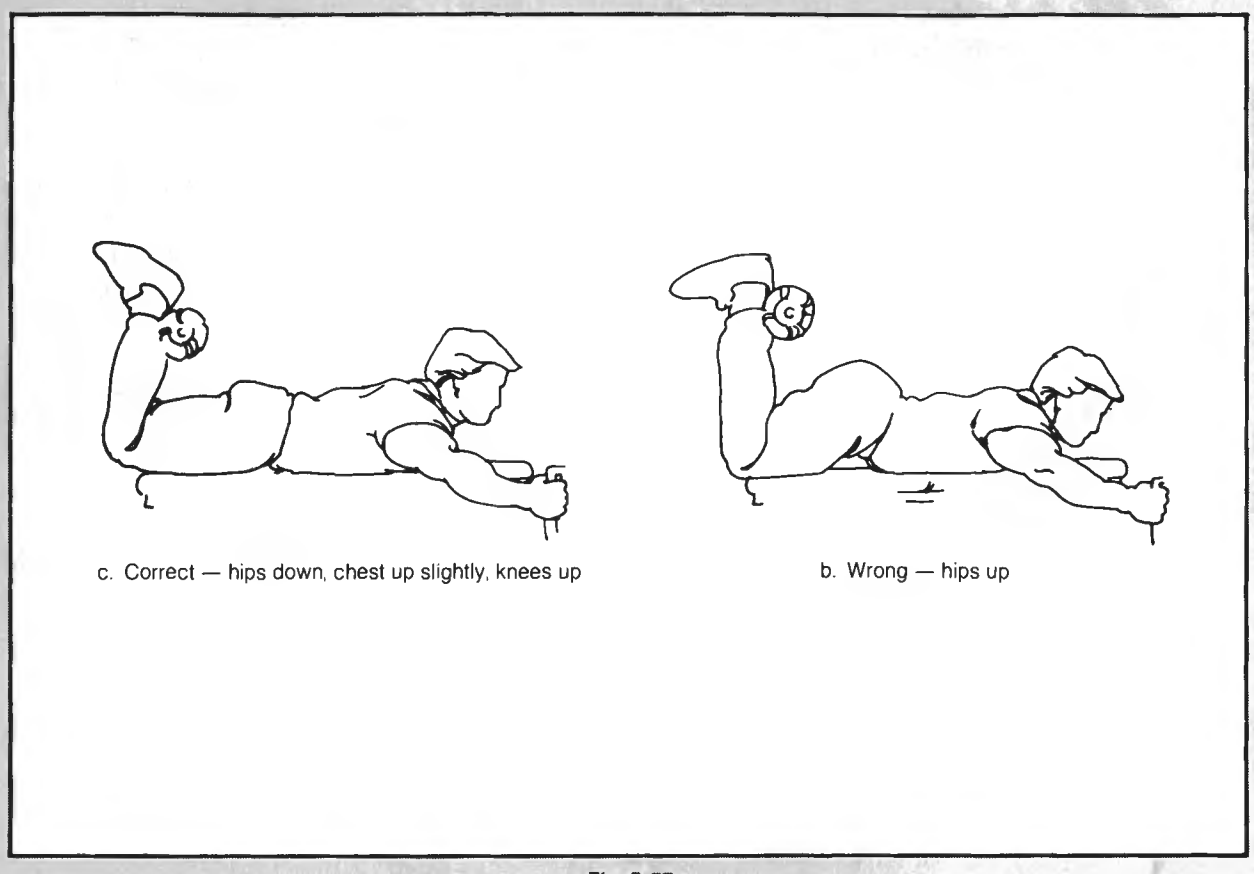
Lie down on a Leg Curl machine, but for a moment, don't hook your feet under the bar. Lift your chest off the bench and support yourself on your elbows ("Sphinx" position). Tense your gluteus muscles and shift around until you feel your pelvis pressing down against the bench. You should now be able to lift your knees up off the bench so you are supporting yourself on your elbows and pelvis/thighs. Try it. You will probably feel tension in your hamstrings from this setup posture—and you haven't even started the exercise yet! *That* is the feeling you should have in your body when doing Leg Curls.



a. Finding correct posture

Fig. 5-57a

O.K., so now let's do it. Hook your feet under the Leg Curl bar. Drop your chest down flat against the bench, but keep your head up and your back arched slightly. Curl the bar up as high as it will go. Feel for the same body tension you felt during the preliminary exercise. In fact, you should still feel as if you could lift your knees off the bench at the peak of the movement. If you can't get the bar up all the way, **decrease the weight**. Leg Curls are only effective when done with good form. It's the tension in the hamstrings that counts, not the amount of weight!



c. Correct — hips down, chest up slightly, knees up

b. Wrong — hips up

Fig. 5-57

SUSTAINED TENSION SIDE LEG RAISES

prime mover: Tensor Fasciae Latae, Gluteus Medius
synergists: Obliques

This is a special version of the standard Side Leg Raise. Normally, you wouldn't find this exercise in a bodybuilding routine. In fact, most bodybuiling workouts don't include *any* exercises that directly work either the tensor fasciae latae or the particular aspect of the gluteus medius that Side Leg Raises focus on.

In the interests of developing balanced strength at the hip joint and hard, well-defined glutes, this exercise should be included in your routine. (Martial artists will also find it improves the speed and stability of their side- and roundhouse kicks.)

Optimized Technique

Support yourself by holding on to a vertical pole or bar that is fixed in place. Part of the frame of a weight machine will do, as will a lamp or fence post, or even the edge of an open door. Position yourself sideways to the pole. Angle the foot closest to the pole as shown in Fig. 5-58 below. This properly aligns the pelvis for the exercise and relieves pressure on the supporting knee.

Raise your leg straight out to the side as high as it will go. Don't worry if it won't go up very high. Your foot should be parallel to the floor. Turning it so your toe is pointing up shifts the emphasis off the ttensor fasciae latae and the part of the glutes you are trying to work.

Your entire body should be in one plane. To put that another way, you should be able to draw a straight line through your shoulder, hip, and ankle. This defines the Ideal Plane for this exercise. If you bend forward at the waist, or twist over so you are actually facing down, rather than sideways, you decrease the stress on the target muscle segments.

Slowly lower your leg from the raised position, **but only by a foot or so.** Then reverse direction and go back up. (Don't bounce as you change direction.) Repeat, up and down, never touching your foot to the ground. Go for 8-10 reps. Then do the exercise raising your other leg.

If the exercise is too difficult as described, work up to proper form by temporarily allowing the raised leg to touch the ground in between reps.

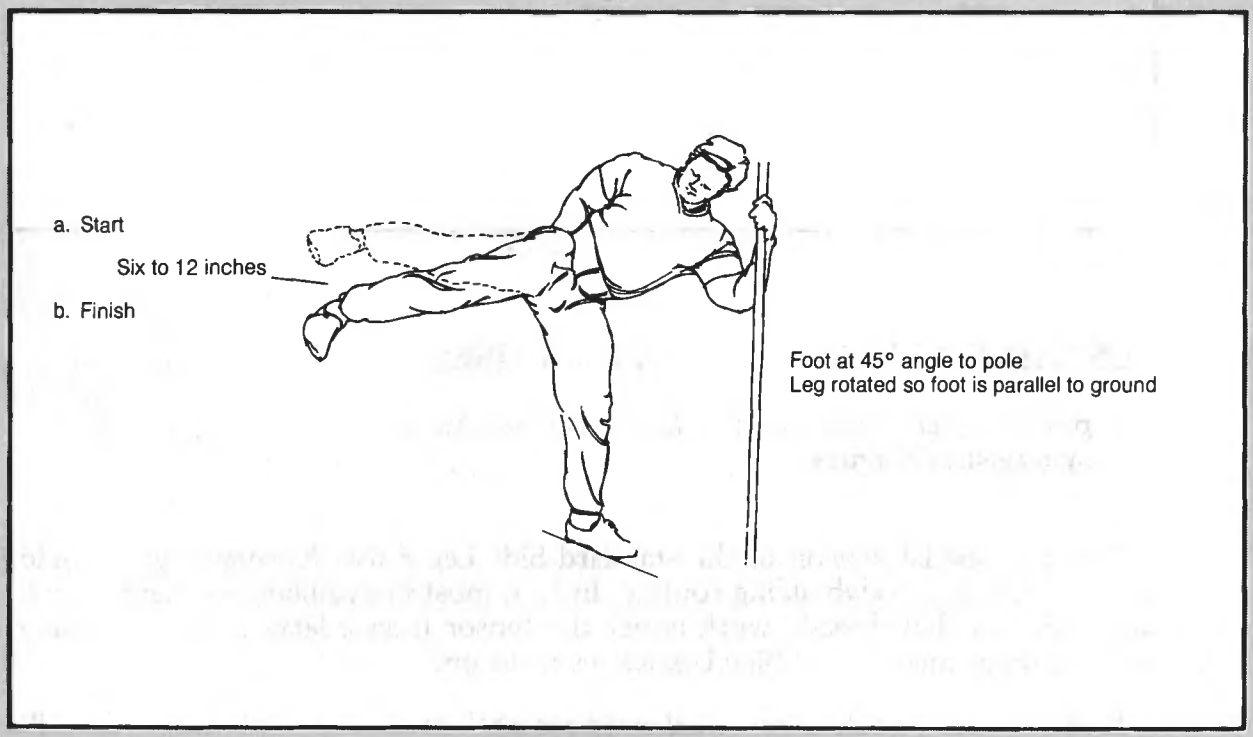
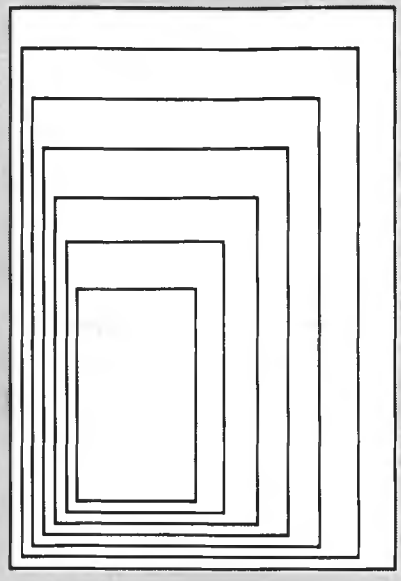


Fig. 5-58



THE ROUTINES

In the previous section, we explored the guidelines for optimizing exercise performance. One effective way to use this course is to modify the exercises in your own routine based on those guidelines. That alone should lead to a substantial increase in the effectiveness of your training.

Of course, there's no reason to stop at optimum performance. Proper **exercise sequence** takes you even further along the path toward the perfect program.

In this section, we combine the exercises from the last section into a series of routines—ranging from simple to complex—designed to give you maximum results in minimum time. The routines are also intended to illustrate the concepts of optimizing exercise sequence, and can be used as templates, or patterns, from which to design more individualized routines. By following the instructions in this course, you should be able to construct the ultimate program for you, tailored to your own needs, goals, and body structure.

We're going to present two different approaches to applying the exercise sequence guidelines.

The first is centered around the concept of **balanced development.** If you have limited time to spend in the gym, or want to use weights to supplement other sports pursuits like martial arts but don't want to spend all day hefting the heavy metal around, this approach is for you! It will help you develop substantial strength and/or bulk in just three 30-45 minute workouts per week.

The second approach is the "pure" bodybuilding approach. Individual routines for each body part are optimized according to the sequence guidelines and then the workout is ordered according to the Interdependency Principle. This is an advanced, powerful program that will generate incredible gains. Performance time: a little over an hour.

Choose an approach according to your needs.

APPROACH 1 — *BODYBUILDER POWER, CONDENSED*

Balanced development, remember, calls for devoting equal effort to strengthening the opposing muscles at each joint: biceps/triceps at the elbow, quadriceps/hamstrings at the knee, etc. One way of achieving balanced development is performing a series of **supersets** (two exercises done back-to-back without rest) featuring exercises for those opposing muscle groups.

Examples:

For:	**BICEPS / TRICEPS**
Superset:	**Preacher Curls / Lying French Press**
For:	**QUADS / HAMSTRINGS**
Superset:	**Leg Extensions / Leg Curls**

Not only do supersets virtually assure balanced development, they also produce higher Fatigue/Tension levels than the **set**/rest/**set**/rest arrangement—another plus!

So let's take the idea of a series of supersets, and optimize according to the sequencing guidelines discussed in previous sections.

To start with, we will pick at least one functional strength and one isolation exercise for each muscle in each pair, say Bench Press (functional) and Pec Flys (isolation) for the chest, and Close-Grip Pull-Downs (functional) and HFL Decline Rows (isolation) for the Upper Back. These we will arrange into two supersets moving from "functional" to "isolation":

Bench Press / Close-Grip Pull-Downs	(Functional)
	then
Pec Flys / HFL Decline Rows	(Isolation)

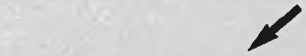
The series of supersets will be arranged to progress from the center of the body out, and the ground up.

And, wherever possible, we will pick exercises that allow us to employ the remaining interdependency rules, like *Superset two exercises that employ different synergists for the same prime mover...*

Upright Rows / Military Press

...and *Arrange exercises so a muscle that functions as synergist or stabilizer in one exercise functions as prime mover in the next:*

Pec Flys / HFL Decline Rows



Spinal erectors are *stabilizers* during HFL Decline Row, *prime mover* during Hyperextensions

Hyperextensions / Ab work

There is one potential problem with this arrangement: calves and abdominals don't respond well to routines containing only one or two exercises, and performing *groups* of exercises for these body parts would disrupt the flow of supersets.

So let's rearrange the sequence like this:

Ground ↓ **Up**

ABDOMINALS

QUADS / HAMSTRINGS

CHEST / BACK

LOWER BACK

SIDE / FRONT / REAR DELTS

BICEPS / TRICEPS

FOREAM FLEXORS / FOREARM EXTENSORS

CALVES

Center ↓ **Outward**

This arrangement has two advantages: it allows abdominal and calve multi-exercise routines to be performed without disrupting the flow of the program; it allows your abdominal work—which usually involves a fair amount of hanging, twisting, and flexing—to function as a warmup for the entire routine.

As far as the lower back goes, we will take advantage of the fact that it won't have an opposing muscle group partner (since we'll already have worked the abs) by supersetting two lower back exercises with different leverage curves—Good Mornings and Hyperextensions.

And there is the basis for the **Bodybuilder Power, Condensed** routines.

LEVEL A — BODYBUILDER POWER, CONDENSED

Start here if you're a beginner. If you've been training for a year or more, you can jump immediately to **Level 1**.

Level A is intended as a springboard to more intense work. It contains few functional strength exercises, instead focusing on isolation exercises intended to get you in touch right away with how it should "feel" to work each muscle group. Also, the numbers of reps on this level are higher than optimum for promoting strength and mass. This limits the amount of weight you can use, giving your body a chance to adapt to the rigours of weight training. The idea is to take it slow and build a solid foundation for future work.

When you first start out, perform only **one** of each of the supersets. In other words, go straight down the list of exercises with no rest and no repeats: do a set of Leg Extensions followed immediately by a set of Hamstring Curls; no rest; do a set of Bench Press followed immediately by a set of Close-Grip Pull-Downs; no rest, etc. Remember to follow the guidelines from the Exercise Section. Precision is the key! Even a routine as simple as this can be an effective tool **if the exercises are performed with attention to detail**.

When doing the routine with one superset gets too easy, add a second, and finally, a third. Each **group** of supersets should be performed without resting: Exercise 1, no rest, Exercise 2, no rest, Exercise 1, no rest, etc. In other words, you only rest twice in the entire routine, once during hyperextensions, and once during 21's. (So it's harder than it looks.)

1 time	Legendary Abs routine
3 supersets	Leg Extensions ..... 10-12 reps (first two sets toes pointed, third set, toes back) Hamstring Curls ..... 10-12 reps no rest
3 supersets	Bench Press ..... 8-10 reps Close-Grip Pull Downs ..... 8-10 reps no rest
2 sets	Hyperextensions ..... 12-15 reps 10 second rest in between sets no rest after the second set
2 giant sets	21'S Lateral (side) Delt Flys ..... 7 reps no rest Anterior (front) Delt Flys ..... 7 reps no rest Posterior (rear) Delt Flys ..... 7 reps 10 second rest in between giant sets no rest after the second giantset
3 supersets	Preacher Bench Curls ..... 8-10 reps Tricep Press-downs ..... 8-10 reps

LEVEL B — BODYBUILDER POWER, CONDENSED

This level is also intended for beginners. Here, though, we begin to incorporate functional strength exercises. Unlike the higher levels, at this level we pre-exhaust even if it isn't necessary. This decreases the amount of weight you are able to handle during the functional strength work, limiting the strain on joints and tendons.

Once again, there is no rest during groups of supersets.

1 time	Legendary Abs routine	
	no rest	
3 supersets	Leg Extensions	10-12 reps
	(first two sets toes pointed, third set, toes back)	
	Hamstring Curls	10-12 reps
	no rest	
3 supersets	Hack Squats	8-10 reps
	Side Leg Raises	8-10 reps
	no rest	
2 sets	Hyperextensions	10-12 reps
	10 second rest in between sets no rest after the second set	
3 supersets	Bench Press	8-10 reps
	Close-Grip Pull Downs	8-10 reps
	no rest	
	21's	
2 giant sets	Lateral (side) Delt Flys	7 reps
	Anterior (front) Delt Flys	7 reps
	Posterior (rear) Delt Flys	7 reps
	Military Press	8-10 reps
	no rest	
3 supersets	Preacher Bench Curls	8-10 reps
	Lying French Press	8-10 reps

LEVEL 1 — BODYBUILDER POWER, CONDENSED

At this level, we no longer pre-exhaust just to limit the amount of weight you can use. Notice, for instance, that Military Presses now precede 21's in the Military Press/21s superset instead of following them as they did on the previous level. And rep numbers are lower—time to start bumping up the weight.

1 time	Legendary Abs routine	
	no rest	
3 supersets	Leg Extensions	6-8 reps
	(first two sets toes pointed, third set, toes back)	
	Hamstring Curls	6-8 reps
	no rest	
3 supersets	Hack Squats	8-10 reps
	Side Leg Raises	8-10 reps
	no rest	
2 sets	Good Mornings	8-10 reps
	10 second rest in between sets no rest after the second set	
3 supersets	Bench Press	6-8 reps
	Close-Grip Pull-Downs	6-8 reps
	no rest	
3 supersets	Pec Flys	6-8 reps
	One-arm Rows (left arm)	6-8 reps
	(right arm)	6-8 reps
	no rest	
	Military Press	6-8 reps
	21's	
2 giant sets	Lateral (side) Delt Flys	7 reps
	Anterior (front) Delt Flys	7 reps
	Posterior (rear) Delt Flys	7 reps
	no rest	
3 supersets	Preacher Bench Curls	6-8 reps
	Lying French Press	6-8 reps

LEVEL 2 — BODYBUILDER POWER, CONDENSED

If you regularly train with weights, you can begin at this level. The entire routine should only take about 30 to 45 minutes. But because the sequence is synergistic, this short routine is more effective—and will give you a better burn—than many routines taking twice as long!

— standard version

1 time	Legendary Abs routine
3 supersets	Squats ..... 6-8 reps Hack Squats ..... 6-8 reps no rest
4 supersets	Leg Extensions ..... 6-8 reps (two sets toes pointed, two sets, toes back) Hamstring Curls ..... 6-8 reps no rest
3 supersets	Bench Press ..... 6-8 reps HFL Decline Rows ..... 6-8 reps no rest
3 supersets	Pec Flys ..... 6-8 reps Close-Grip Pull-Ups ..... 6-8 reps no rest
2 giant sets	Upright Row ..... 6-8 reps Military Press ..... 6-8 reps Rear Delt Flys ..... 6-8 reps no rest
3 supersets	Standing Barbell Curl ..... 6-8 reps French Press ..... 6-8 reps no rest
3 supersets	Seated Incline Dumbell Curl ..... 6-8 reps Kick-Backs ..... 6-8 reps no rest
2 supersets	Good Mornings ..... 8 -10 reps Hyperextensions ..... 10-12 reps

— with no severe open joint stress

1 time	Legendary Abs routine
4 supersets	Leg Extensions ..... 6-8 reps (two sets toes pointed, two sets, toes back) Hamstring Curls ..... 6-8 reps no rest
3 supersets	1/4 Hack Squats ..... 6-8 reps Side Leg Raises ..... 6-8 reps each side no rest

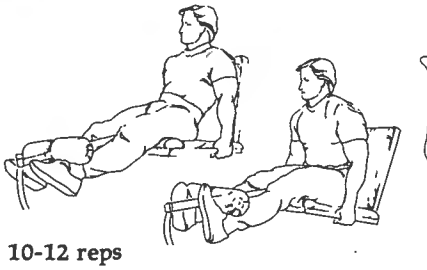
3 supersets	Bench Press	6-8 reps
	HFL Decline Rows	6-8 reps
	no rest	
3 supersets	Pec Flys	6-8 reps
	Close-Grip Pull Ups	6-8 reps
	no rest	
	Upright Row	6-8 reps
2 giant sets	Military Press	6-8 reps
	Rear Delt Flys	6-8 reps
	no rest	
3 supersets	Standing Barbell Curl	6-8 reps
	French Press	6-8 reps
	no rest	
3 supersets	Seated Incline Dumbell Curl	6-8 reps
	Kick-Backs	6-8 reps
	no rest	
2 supersets	Good Mornings	8 -10 reps
	Hyperextensions	10-12 reps

'Condensed' Routines Illustrated

LEVEL A

Legendary Abs routine

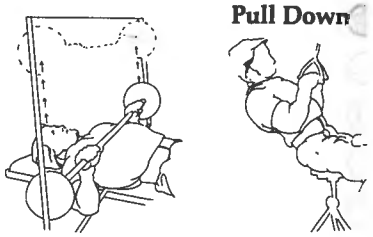
Leg Extensions — Hamstring Curls



10-12 reps — 10-12 reps

3 supersets

Bench Press — Close-Grip Pull Down



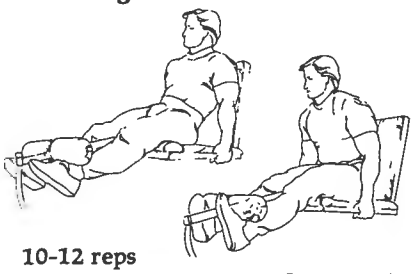
8-10 reps — 8-10

3 supersets

LEVEL B

Legendary Abs routine

Leg Extensions — Hamstring Curls



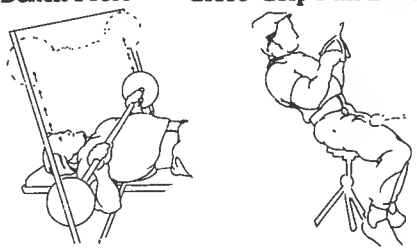
10-12 reps — 10-12 reps

3 supersets

Hack Squa

8-10 reps

Bench Press — Close-Grip Pull Downs



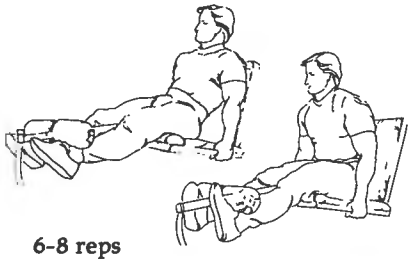
8-10 reps — 8-10 reps

3 supersets

LEVEL 1

Legendary Abs routine

Leg Extensions — Hamstring Curls



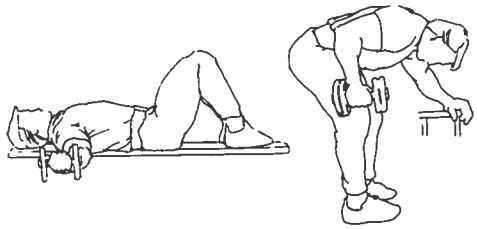
6-8 reps — 6-8 reps

3 supersets

Hack Squ

8-10 reps

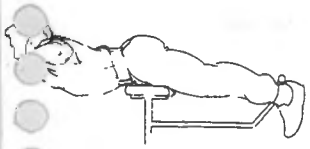
Pec Flys — One-arm Rows



6-8 reps — 6-8 reps

3 supersets

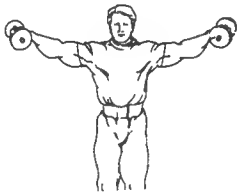
Hyperextensions



12-15 reps

2 sets 10 second rest between

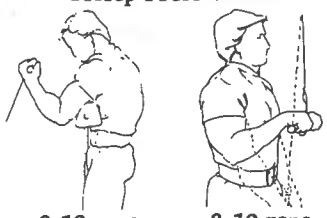
Delt Flys

Lateral	Anterior	Posterior
		
7 reps	7 reps	7 reps

2 giant sets

Preacher Bench Curls

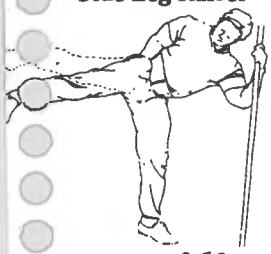
Tricep Press-downs



8-10 reps 8-10 reps

3 supersets

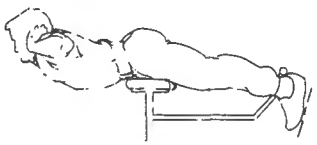
Side Leg Raises



8-10 reps

3 supersets

Hyperextensions



10-12 reps

2 sets 10 second rest between sets

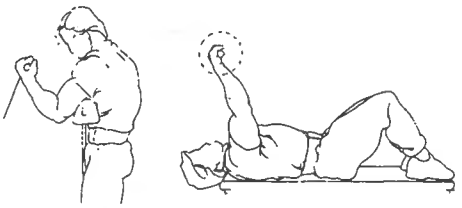
Delt Flys — **Military Press**

Lateral	Anterior	Posterior	
7 reps	7 reps	7 reps	8-10 reps

2 giant sets

Preacher Bench Curls

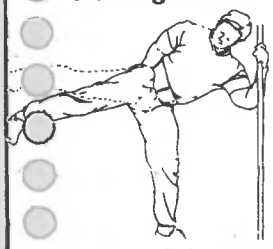
Lying French Press



8-10 reps 8-10 reps

3 supersets

Side Leg Raises



8-10 reps

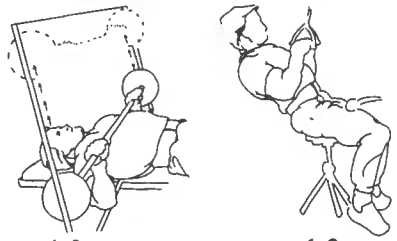
3 supersets

Good Mornings

8-10 reps

2 sets 10 second rest between sets

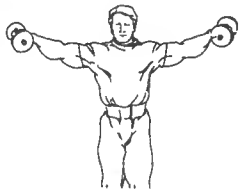
Bench Press — Close-Grip Pull-Downs



6-8 reps 6-8 reps

3 supersets

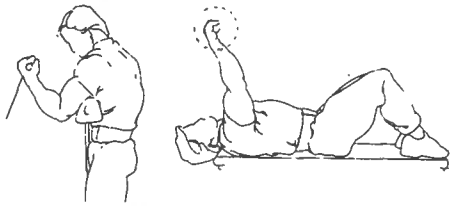
Military Press — **Delt Flys**

	Lateral	Anterior	Posterior
			
6-8 reps	7 reps	7 reps	7 reps

2 giant sets

Preacher Bench Curls

Lying French Press



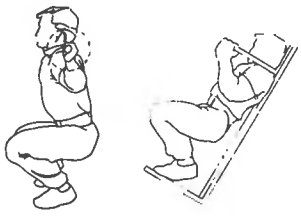
6-8 reps 6-8 reps

3 supersets

LEVEL 2

Legendary Abs routine

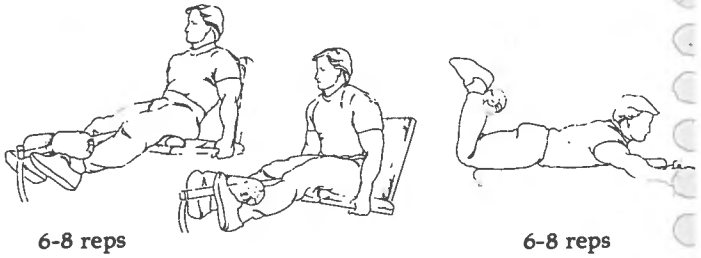
Squats — Hack Squats



6-8 reps 6-8 reps

3 supersets

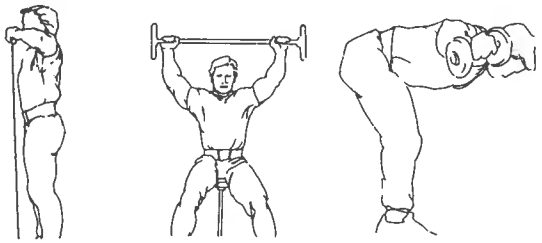
Leg Extensions — Hamstring Curls



6-8 reps 6-8 reps

3 supersets

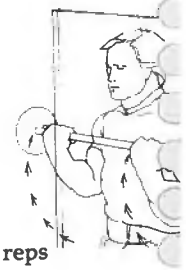
Upright Row — Military Press — Rear Delt Flys



6-8 reps 6-8 reps 6-8 reps

2 giant sets

Standing Barbell



6-8 reps

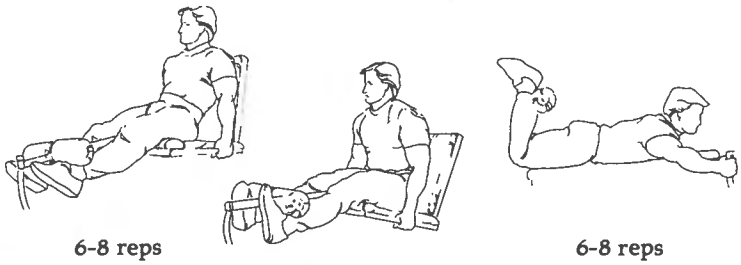
3 supers

minimal open joint stress

LEVEL 2

Legendary Abs routine

Leg Extensions — Hamstring Curls



6-8 reps 6-8 reps

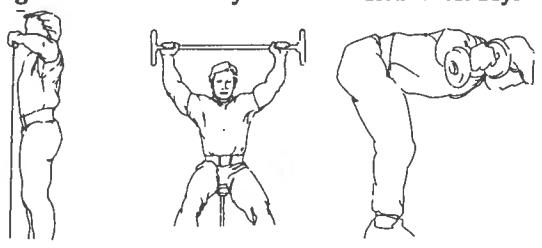
3 supersets

1/4 Hack Squ

6-8 re

3 supers

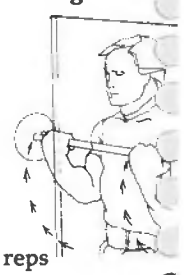
Upright Row — Military Press — Rear Delt Flys



6-8 reps 6-8 reps 6-8 reps

2 giant sets

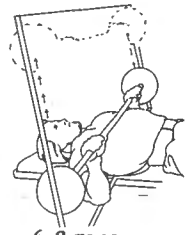
Standing Barbell



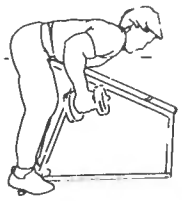
6-8 reps

3 super

Bench Press — **HFL Decline Rows**



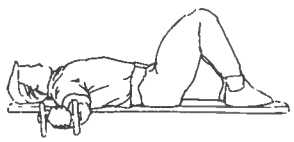
6-8 reps



6-8 reps

3 supersets

Pec Flys — **Close-Grip Pull-Ups**

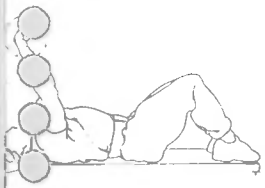


6-8 reps

6-8 reps

3 supersets

French Press



6-8 reps

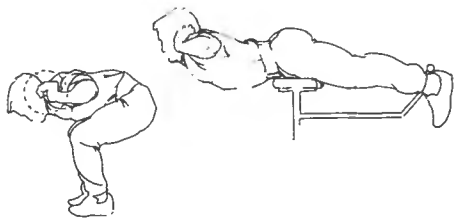
Seated Incline Dumbell Curl — **Kick-Backs**

6-8 reps

6-8 reps

3 supersets

Good Mornings — **Hyperextensions**

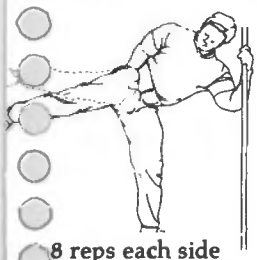


8 -10 reps

10-12 reps

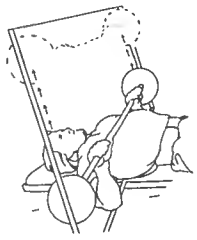
3 supersets

ide Leg Raises

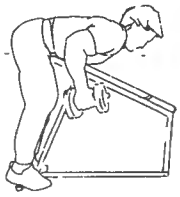


8 reps each side

Bench Press — **HFL Decline Rows**



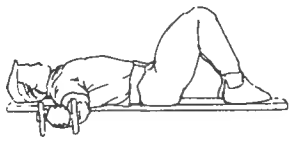
6-8 reps



6-8 reps

3 supersets

Pec Flys — **Close-Grip Pull-Ups**



6-8 reps

6-8 reps

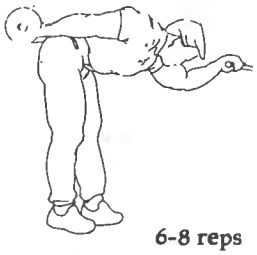
3 supersets

French Press

6-8 reps

Seated Incline Dumbell Curl — **Kick-Backs**

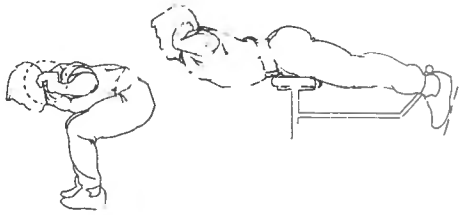
6-8 reps



6-8 reps

3 supersets

Good Mornings — **Hyperextensions**



8 -10 reps

10-12 reps

3 supersets

APPROACH 2 — *BODYBUILDER POWER, EXPANDED*

The **Condensed** routines we've just covered are designed to be useable by the athlete who doesn't have access to a fully equipped gym. Most of the exercises—except those for the lower body—can be done without special equipment.

The **Expanded** routines below include exercises that do require equipment found in good bodybuilding gyms. Where possible, though, we have specified alternate exercises that can be performed with more simple equipment—dumbells, barbells, chin-up bars, etc.

These routines are designed to produce the ultimate physique. They are the routines of the serious bodybuilder, of the athlete willing to train intensely to develop incredible strength, definition, and/or mass. We know how hard you work in the gym. We want you to get everything possible for your efforts!

The overall **Bodybuilder Power, Expanded** sequence is determined by the *Train from the center of the body out* rule, modified the same way as during the **Condensed** routines.

Then, for each body part, the exercises are organized as follows:

- First, functional strength exercises.

  If a particular functional strength exercise has a synergist likely to tire before the prime mover, a pre-exhaustion exercise for the prime mover is included before the functional strength exercise.

- Next, a series of other exercises, sequenced to progressively increase isolation of the prime mover, and to isolate different parts of the prime mover. The order within this group is determined by these guidelines:

  - Avoid working a muscle segment as prime mover before that muscle segment is called on to function as a synergist.

  - When possible, do back-to-back exercises for a prime mover using different synergists

  - Avoid doing several exercises in a row with the same synergist, or at least, sequence exercises to vary the extent of the synergist's contribution: heavy contribution, light contribution, heavy, etc.

  - Employ combinations of exercises with different leverage curves

  - Use sequence to promote isolation.

The body parts are listed in the order they should be worked. For each, there is a progression of levels from beginning to advanced. You should mix and match as you progress. For example, if your upper back develops more quickly than your chest, you might want to move up to the **Level 2** upper back routine while still doing the **Level 1** chest routine.

For each body part, beginner levels are lettered, as opposed to numbered. **Level A** employs one or two isolation exercises intended to get you in touch with how it should "feel" to train a particular body part. **Level B** contains one or two functional strength exercises to start building strength and packing on the mass.

From there, the levels increase in intensity until, at the highest point, you are sometimes doing five or six exercises for a body part. Often, though, you are only doing one or two sets of those exercises. Synergism means working smart, not long!

BODYBUILDER POWER, EXPANDED

ABS Legendary Abs routine

LOWER BODY

LEVEL A

Exercise	*Goal*	*Rest between sets*
Leg Extensions, toes pointed	2 sets/8-10 reps	25 seconds
Leg Extensions, toes back	2 sets/8-10 reps	25 seconds
Leg Curls	3 sets/8-10 reps	25 seconds

LEVEL B

Squats	3 sets/8-10 reps	25 seconds

LEVEL 1

Squats	3 sets/8-10 reps	25 seconds
Leg Extensions, toes pointed	1 set /6-8 reps	
Leg Extensions, toes back	1 set /6-8 reps	
Leg Curls	3 sets/6-8 reps	25 seconds

LEVEL 2

Squats	3 sets/8-10 reps	25 seconds
Leg Extensions, toes pointed	2 sets/6-8 reps	25 seconds
Leg Extensions, toes back	2 sets/6-8 reps	25 seconds
Leg Curls	3 sets/6-8 reps	25 seconds
Hack Squats	3 sets/8-10 reps	25 seconds
Rope Hack Squats	1 set /8-10 reps	
Sustained Tension Side Leg Lifts	1 set/8-10 reps	

LEVEL 2 — with no severe open joint stress

Leg Extensions, toes pointed	3 sets/6-8 reps	25 seconds
Leg Extensions, toes back	2 sets/6-8 reps	25 seconds
Leg Curls	3 sets/6-8 reps	25 seconds
1/4 Hack Squats	4 sets/8-10 reps	25 seconds
Rope Hack Squats	1 set /8-10 reps	
Sustained Tension Side Leg Lifts	1 set/8-10 reps	

LOWER BODYcontinued...

LEVEL 2

Exercise		*Goal*	*Rest between sets*
Squats		3 sets/8-10 reps	25 seconds
Leg Extensions, toes pointed	3 supersets	/6-8 reps	no rest!
Leg Curls		/6-8 reps	
Leg Extensions, toes back		2 sets/6-8 reps	25 seconds
Hack Squats	3 supersets	/8-10 reps	25 seconds
Sustained Tension Side Leg Lifts		/8-10 reps	
Rope Hack Squats		1 set /8-10 reps	no rest!

LEVEL 3 — with no severe open joint stress

Leg Extensions, toes pointed	3 supersets	/6-8 reps	no rest!
Leg Curls		/6-8 reps	
Leg Extensions, toes back		2 sets/6-8 reps	25 seconds
1/4 Hack Squats	3 supersets	/8-10 reps	no rest!
Sustained Tension Side Leg Lifts		/8-10 reps	
Rope Hack Squats		1 set /8-10 reps	

UPPER BODY

BACK

LEVEL A

Exercise	*Goal*	*Rest between sets*
Close-Grip Pull-Downs	3 sets/8-10 reps	25 seconds
Hyperextensions	2 sets/12-15 reps	10 seconds

LEVEL B

Scapular Rolls	3 supersets	/6-8 reps	no rest!
Close-Grip Pull-Downs		/6-8 reps	
Hyperextensions		3 sets/10-12 reps	10 seconds.

LEVEL 1

HFL Decline Rows	3 supersets	/6-8 reps	
Close-Grip Pull-Ups		/6-8 reps	
Wide-Grip Pull-Downs		1 set/6-8 reps (good luck!)	
Seated Single-Handed Rows		1 set/6-8 reps	
Hyperextensions		2 sets/10-12 reps	10 seconds
Alternate Side Hyperextensions		1 set/10-12 reps	

LEVEL 2

HFL Decline Rows	3 supersets	/6-8 reps	
Close-Grip Pull-Ups		/6-8 reps	
Momentum Twisting Pull-Ups		2 sets/6-8 reps	25 seconds
Wide-Grip Pull-Ups		1 set/6-8 reps (good luck!)	
Seated Single-Handed Rows		1 set/6-8 reps	
Good Mornings		1 set/10-12 reps	10 seconds
Alternate Side Hyperextensions		2 sets/10-12 reps	

BACK continued...

LEVEL 3

Exercise		*Goal*	*Rest between sets*
Scapular Rolls	2 supersets	/6-8 reps	no rest!
Close-Grip Pull-Downs		/6-8 reps	
HFL Decline Rows		2 sets/6-8 reps	25 seconds
Close-Grip Pull-Ups		2 sets/6-8 reps	25 seconds
Momentum Twisting Pull-Ups		2 sets/6-8 reps	25 seconds
Wide-Grip Pull-Ups		1 set/6-8 reps (good luck!)	
Seated Single-Handed Rows		1 set/6-8 reps	
Good Mornings		2 sets/8-10 reps	25 seconds
Alternate Side Hyperextensions		1 set/10-12 reps	

LEVEL 4

Scapular Rolls	3 supersets	/6-8 reps	no rest!
Close-Grip Pull-Downs		/6-8 reps	
HFL Decline Rows		3 sets/6-8 reps	25 seconds
Close-Grip Pull-Ups		2 sets/6-8 reps	25 seconds
Momentum Twisting Pull-Ups		2 sets/6-8 reps	25 seconds
Wide-Grip Pull-Ups		1 set/6-8 reps (good luck!)	
Seated Single-Handed Rows		1 set/6-8 reps	
Good Mornings		2 sets/8-10 reps	25 seconds
Alternate Side Hyperextensions		2 sets/10-12 reps	10 seconds

CHEST

LEVEL A

Exercise	*Goal*	*Rest between sets*
Supine Bench Press	3 sets/8-10 reps	25 seconds

LEVEL B

Supine Bench Press	1 set /8-10 reps	
Incline Bench Press	1 set /8-10 reps	

LEVEL 1

Supine Bench Press	3 sets/6-8 reps	25 seconds
Incline Bench Press	3 sets/6-8 reps	25 seconds

LEVEL 2

Supine Bench Press	3 sets/6-8 reps	25 seconds
Incline Bench Press	2 sets/6-8 reps	25 seconds
Incline Dumbell Press	1 set/ 6-8 reps	
Cross-Body Cable Pulls	1 set/ 6-8 reps	

LEVEL 3

Supine Bench Press	3 sets/6-8 reps	25 seconds
Incline Bench Press	3 sets/6-8 reps	25 seconds
Incline Dumbell Press	1 set/ 6-8 reps	
Cross-Body Cable Pulls	2 sets/6-8 reps	25 seconds

DELTS

LEVEL A

Exercise		*Goal*	*Rest between sets*
21's		1 set/7,7,7 reps	no rest!

LEVEL B

Military Press		3 sets/8-10 reps	25 seconds
Anterior Delt Flys	1 superset	/6-8 reps	no rest!
Posterior Delt Flys		/6-8 reps	

LEVEL 1

Military Press	2 supersets	/6-8 reps	no rest!
Upright Rows		/6-8 reps	
21's		1 set/7,7,7 reps	no rest!

LEVEL 2

Military Press	2 supersets	/6-8 reps	no rest!
Upright Rows		/6-8 reps	
21's		2 sets/7,7,7 reps	no rest!

BICEPS

LEVEL A

Exercise	*Goal*	*Rest between sets*
Preacher Bench Cable Curls	3 sets/8-10 reps	25 seconds

LEVEL B

Preacher Bench Cable Curls	2 sets/8-10 reps	25 seconds
Standing Supinated DB Curls	2 sets/8-10 reps	25 seconds

LEVEL 1

Preacher Bench Cable Curls	3 sets/6-8 reps	25 seconds
Standing Supinated DB Curls	2 sets/6-8 reps	25 seconds
Seated Supinated DB Curls (left hand set, right hand set)	1 set/ 6-8 reps	no rest!

LEVEL 2

Preacher Bench Cable Curls	3 sets/6-8 reps	25 seconds
Standing Supinated DB Curls	3 sets/6-8 reps	25 seconds
Seated Supinated DB Curls (left hand set, right hand set, left hand set, right hand set)	2 sets/6-8 reps	no rest!

TRICEPS

LEVEL A

Exercise		*Goal*	*Rest between sets*
Tricep Press-Downs		3 sets/8-10 reps	
Tricep Press-Downs	3 supersets	/8-10 reps	no rest!
Tricep Bench-Dips		/8-10 reps	

LEVEL 1

Lying French Press		3 sets/6-8 reps	25 seconds

LEVEL 2

Lying French Press		3 sets/6-8 reps	25 seconds
Tricep Press-Downs	2 supersets	/6-8 reps	no rest!
Tricep Bench-Dips			/6-8 reps

LEVEL 3

Lying French Press		3 sets/6-8 reps	25 seconds
Tricep Press-Downs	3 supersets	/6-8 reps	no rest!
HFL Tricep Push-Ups		/6-8 reps	

LEVEL 4

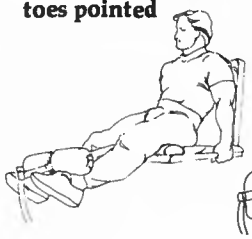
Lying French Press		3 sets/6-8 reps	25 seconds
Tricep Press-Downs	3 supersets	/6-8 reps	no rest!
HFL Tricep Push-Ups		/6-8 reps	
Tricep Kick-Backs (alternate hands: do set with left arm, set with right, etc.)		2 sets/6-8 reps (each hand)	no rest!

ALTERNATE LEVEL 4

Tricep Press-Downs	3 supersets	/6-8 reps	no rest!
Tricep Dips		/6-8 reps	
HFL Tricep Push-Ups		3 sets/6-8 reps	
Tricep Kick-Backs (alternate hands: do set with left arm, set with right, etc.)		2 sets/6-8 reps (each hand)	no rest!

LEVEL A

Leg Extensions toes pointed



2 sets/8-10 reps

Leg Extensions toes back

2 sets/8-10 reps

Leg Curls

3 sets/8-10 reps

LEVEL B

Squats

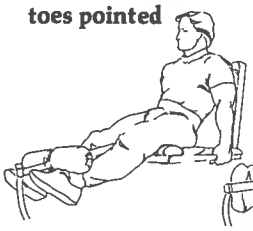
3 sets/8-10 reps

LEVEL 1

Squats

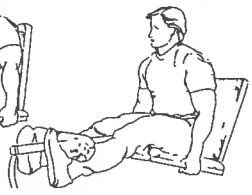
3 sets/8-10 reps

Leg Extensions toes pointed



1 sets/6-8 reps

Leg Extensions toes back



1 sets/6-8 reps

Leg Curls

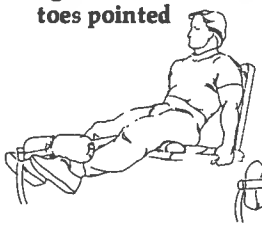
3 sets/6-8 reps

LEVEL 2

Squats

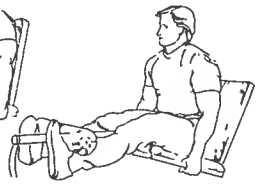
3 sets/8-10 reps

Leg Extensions toes pointed



2 sets/6-8 reps

Leg Extensions toes back



2 sets/6-8 reps

Leg Curls

3 sets/6-8 reps

'Expanded' Routines, Illustrated

Lower Body

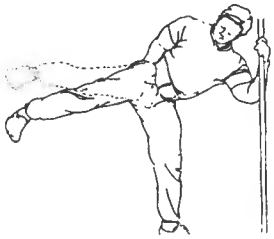
Hack Squats

sets/8-10 reps

Rope Hack Squats

1 set /8-10 reps

Side Leg Lifts



1 set/8-10 reps

Lower Body, continued...

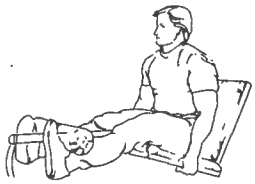
minimal open joint stress

LEVEL 2

Leg Extensions toes pointed

3 sets/6-8 reps

Leg Extensions toes back



2 sets/6-8 reps

Leg Curls

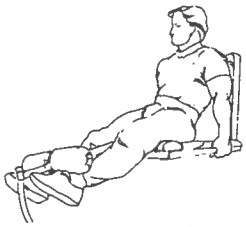
3 sets/6-8 reps

LEVEL 3

Squats

3 sets/8-10 reps

Leg Extensions



3-8 reps

Leg Curls

6-8 reps

3 supersets

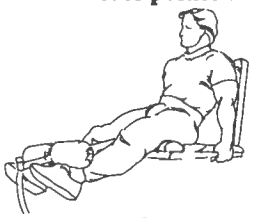
Leg Extensions

2 sets/6-8 reps

minimal open joint stress

LEVEL 3

Leg Extensions toes pointed



6-8 reps

Leg Curls toes back

6-8 reps

3 supersets

Leg Extensions

2 sets/6-8 reps

1/4 Hack Squats

4 sets/8-10 reps

Rope Hack Squats

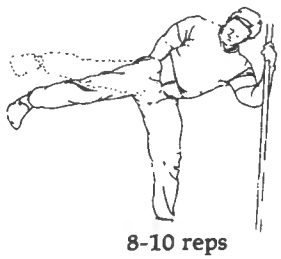
1 set /8-10 reps

Side Leg Lifts

1 set/8-10 reps

Hack Squats — **Side Leg Lifts**

8-10 reps



8-10 reps

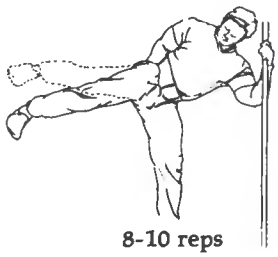
3 supersets

Rope Hack Squats

1 set/8-10 reps

1/4 Hack Squats — **Side Leg Lifts**

8-10 reps



8-10 reps

3 supersets

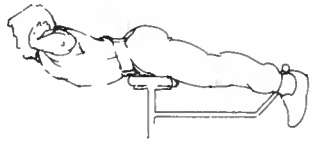
Back

LEVEL A

Close-Grip Pull-Downs

3 sets/8-10 reps

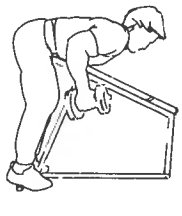
Hyperextensions



2 set/12-15 reps

LEVEL 1

HFL Decline Rows — **Close-Grip Pull-Ups**

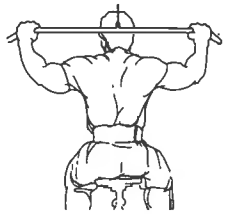


6-8 reps

6-8 reps

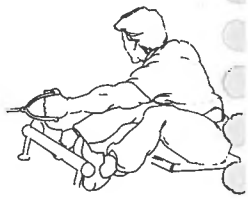
3 Supersets

Wide-Grip Pull-Downs



1 set/6-8 reps

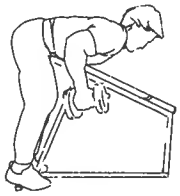
Seated Single-Handed



1 set/6-8 reps

LEVEL 2

HFL Decline Rows — **Close-Grip Pull-Ups**



6-8 reps

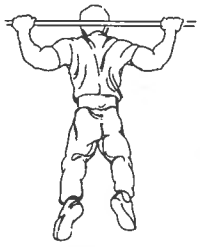
6-8 reps

3 Supersets

Momentum Twisting Pull-Ups

2 sets/6-8 reps

Wide-Grip Pull-Ups



1 set/6-8 reps

LEVEL 3

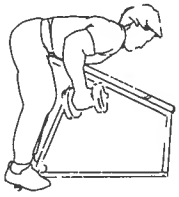
Scapular Rolls — **Close-Grip Pull-Downs**

6-8 reps

6-8 reps

2 supersets

HFL Decline Rows



2 sets/6-8 reps

Close-Grip Pull-Ups

2 sets/6-8 reps

Momentum Twi Pull-Ups

2 sets/6-8 re

LEVEL 4

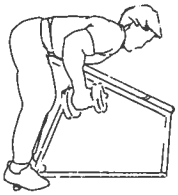
Scapular Rolls — **Close-Grip Pull-Downs**

6-8 reps

6-8 reps

3 supersets

HFL Decline Rows



3 sets/6-8 reps

Close-Grip Pull-Ups

2 sets/6-8 reps

Momentum Twi Pull-Ups

2 sets/6-8 r

LEVEL B

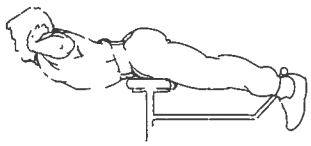
Scapular Rolls — Close-Grip Pull-Downs

6-8 reps

6-8 reps

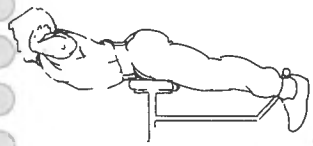
3 supersets

Hyperextensions



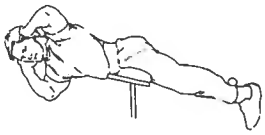
3 sets/10-12 reps

Hyperextensions



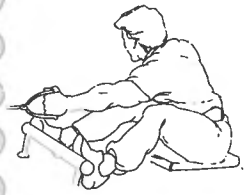
2 sets/10-12 reps

Alternate Side Hyperextensions



1 set/10-12 reps

eated Single-Handed Rows

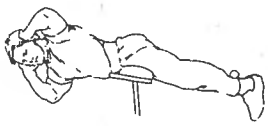


1 set/6-8 reps

Good Mornings

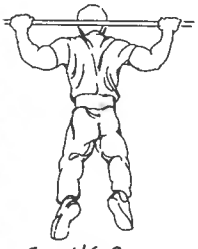
1 set/10-12 reps

Alternate Side Hyperextensions



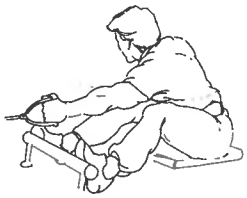
2 sets/10-12 reps

Wide-Grip Pull-Ups



1 set/6-8 reps

Seated Single-Handed Rows

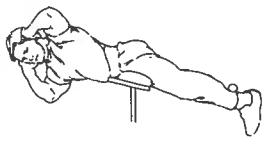


1 set/6-8 reps

Good Mornings

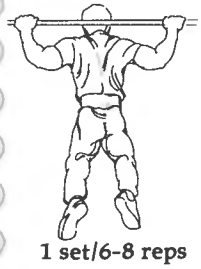
2 sets/8-10 reps

Alternate Side Hyperextensions



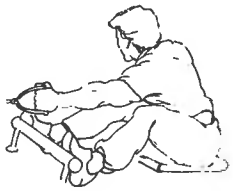
1 set/10-12 reps

Wide-Grip Pull-Ups



1 set/6-8 reps

Seated Single-Handed Rows

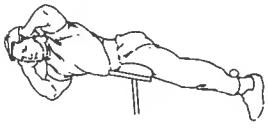


1 set/6-8 reps

Good Mornings

2 sets/8-10 reps

Alternate Side Hyperextensions



2 sets/10-12 reps

Chest

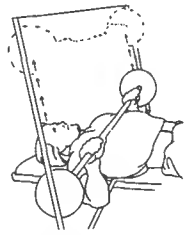
LEVEL A

Supine Bench Press

3 sets/8-10 reps

LEVEL B

Supine Bench Press



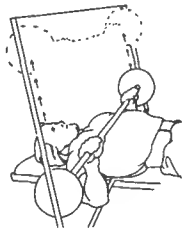
1 set /8-10 reps

Incline Bench Press

1 set /8-10 reps

LEVEL 1

Supine Bench Press



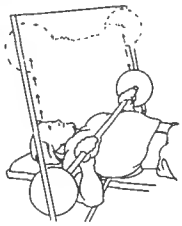
3 sets/6-8 reps

Incline Bench Press

3 sets/6-8 reps

LEVEL 2

Supine Bench Press

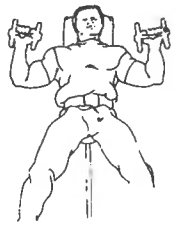


3 sets/6-8 reps

Incline Bench Press

2 sets/6-8 reps

Incline Dumbell Press



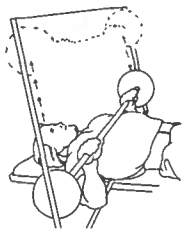
1 set/ 6-8 reps

Cross-Body Cable Pulls

1 set/ 6-8 reps

LEVEL 3

Supine Bench Press



3 sets/6-8 reps

Incline Bench Press

3 sets/6-8 reps

Incline Dumbell Press

1 set/ 6-8 reps

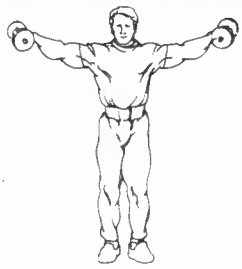
Cross-Body Cable Pulls

2 sets/6-8 reps

Delts

LEVEL A

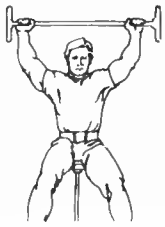
21's



1 set/7,7,7 reps

LEVEL B

Military Press



3 sets/8-10 reps

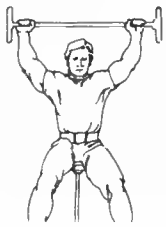
Anterior Delt Flys — Posterior Delt Flys

6-8 reps — 6-8 reps

1 superset

LEVEL 1

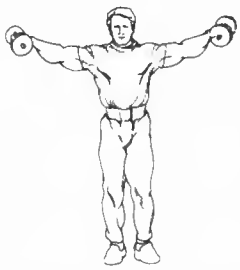
Military Press — Upright Rows



6-8 reps — 6-8 reps

2 supersets

21's



1 set/7,7,7 reps

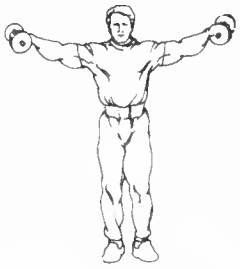
LEVEL 2

Military Press — Upright Rows

6-8 reps — 6-8 reps

2 supersets

21's



2 sets/7,7,7 reps

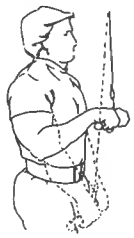
Biceps

LEVEL A	**Preacher Bench Cable Curls** 3 sets/8-10 reps		
LEVEL B	**Preacher Bench Cable Curls** 2 sets/8-10 reps	**Standing Supinated DB Curls** 2 sets/8-10 reps	
LEVEL 1	**Preacher Bench Cable Curls** 3 sets/6-8 reps	**Standing Supinated DB Curls** 2 sets/6-8 reps	**Seated Supinated DB Curls** 1 set/ 6-8 reps
LEVEL 2	**Preacher Bench Cable Curls** 3 sets/6-8 reps	**Standing Supinated DB Curls** 3 sets/6-8 reps	**Seated Supinated DB Curls** 2 sets/6-8 reps

Triceps

LEVEL A

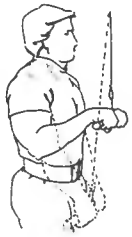
Tricep Press-Downs



3 sets/8-10 reps

LEVEL B

Tricep Press-Downs —— **Tricep Bench-Dips**



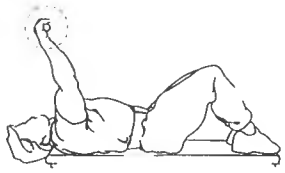
8-10 reps

8-10 reps

3 supersets

LEVEL 1

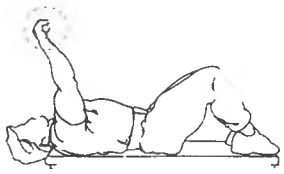
Lying French Press



3 sets/6-8 reps

LEVEL 2

Lying French Press



3 sets/6-8 reps

Tricep Press-Downs —— **Tricep Bench-Dips**

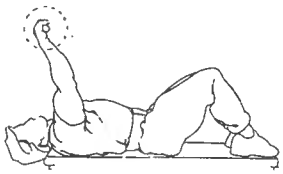
6-8 reps

6-8 reps

2 supersets

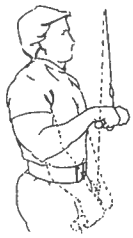
LEVEL 3

Lying French Press



3 sets/6-8 reps

Tricep Press-Downs —— **HFL Tricep Push-Ups**



6-8 reps

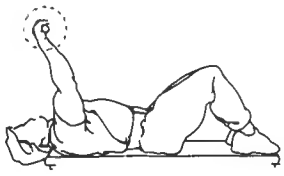
6-8 reps

3 supersets

Triceps, continued...

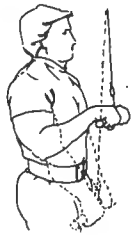
LEVEL 4

Lying French Press

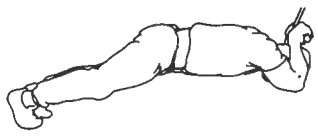


3 sets/6-8 reps

Tricep Press-Downs — HFL Tricep Push-Ups



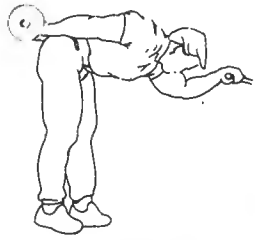
6-8 reps



6-8 reps

3 supersets

Tricep Kick-Backs

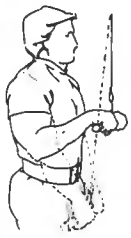


2 sets/6-8 reps

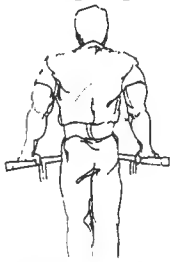
minimal elbow stress

LEVEL 4

Tricep Press-Downs — Tricep Dips



6-8 reps



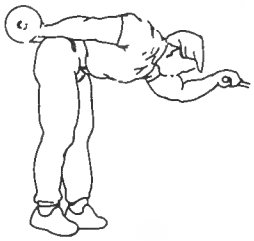
6-8 reps

3 supersets

HFL Tricep Push-up

3 sets/6-8 reps

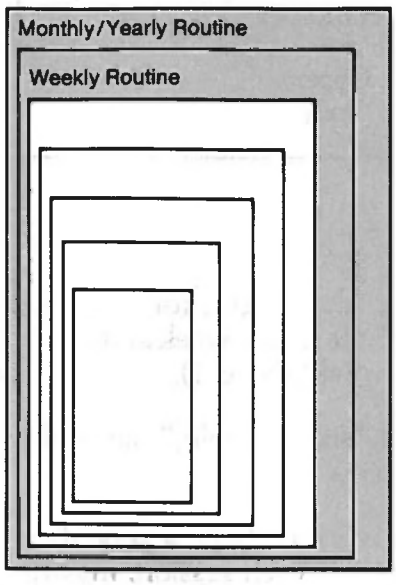
Tricep Kick-Backs



2 sets/6-8 reps (each hand)

Keep in mind these routines are meant to serve as both a specific program to maximize your results *and a doorway to individual experimentation.* It's rather like you've just been given a $1500 Pierre Cardin suit: It may be the finest available off the rack, but a little tailoring will make it that much better.

In the same way, you stand to realize the greatest gains if you tailor this program. Experiment! Try swapping one functional strength exercise for another. Or, where the sequence guidelines allow, try reversing the training order for body parts (e.g. chest/back vs. back/chest). Inevitably, you will find that certain combinations work better for you than others.



Factors to Optimize	Operative Principles
■ Number of workouts	■ Maximum gains without Overtaining
■ Intensity of workouts	
■ Number of days	■ Whole body vs Split training
■ Workout sequence (Which body parts, which days)	■ Interdependency Principle
■ Rest length between workouts	■ Maximum gains without Overtraining

THE *WEEKLY* AND *MONTHLY/YEARLY* ROUTINES:

HOW MUCH, HOW OFTEN

We have worked from the details of rep performance through the guidelines affecting exercise and body part sequence. Now, let's take a look at the most complex elements of the *wholon*—factors influencing the arrangement of routines on a **weekly** and **monthly/yearly** basis.

THE WEEKLY ROUTINE

There are basically two approaches to arranging a weekly routine. The first is to work your **whole body** several days a week. The second is to do a **split routine**, working different body parts on different days.

Beginners

Beginners should stick with the *whole body* approach.

You should use your first three to six months of training to develop a *feel* for weight lifting—to find the "groove" for different exercises. Finding the groove is more a matter of conditioning your nervous system than of building muscle. What you are doing is learning to lift effectively.

During this period, you are also learning to push hard.

We said earlier each muscle is composed of millions of tiny muscle fibers. When you call on a particular muscle, your central nervous system (CNS) activates only some of those fibers. With experience, you learn to force the CNS to activate more and more of them. That's why your "strength" seems to jump up dramatically during your first six months of lifting.

In short, the entire beginning stage is a quest for greater training **intensity.** You have to learn to put everything you've got into each rep. To provide sufficient overload for developing the ability to train intensely, you should work your entire body each session—especially since, at this stage, you only use one or two exercises per body part.

The beginner formula: Work the whole body three days per week (Monday/Wednesday/Friday, Tuesday/Thursday/Saturday, or whatever). **Muscle tissue takes a full 36 hours to recover from a heavy workout.** If you don't skip days in between, you run the risk of *losing* strength and bulk due to insufficient recovery time. Your muscles grow while resting, not while working!

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Lower Body	Upper Body	Lower Body	Upper Body	Lower Body	Upper Body	rest!

Fig. 6-1

Intermediate and Advanced

As intensity goes up, the duration of your workouts must go *down*. You can't sprint miles. Likewise, you can't train at peak intensity for hours at a time. However, as you progress, you want to add more exercises to your routines for each body part to (1) increase the overload, and (2), take advantage of the synergism possible with exercise combination.

Increased intensity necessitates making your routines shorter. Adding more exercises makes your routine longer. How do you resolve this conflict?

By *split training*. You might, for example, work upper body three days a week and lower body three days a week (Fig. 6-1).

This is called a "six-day split," since the routine spans six days.

Spreading your workout over several days decreases the length of each session, making it possible for you to train at high intensity through more exercises.

There are a number of different kinds of splits. We've found the following long-term split plan most effective:

TRAINING LEVEL	SPLIT	DESCRIPTION	PATTERN						
Beginning (6 months - 1 yr)	none 3 days per week	whole body	**DAY 1** whole body	**DAY 2** rest	**DAY 3** whole body	**DAY 4** rest	**DAY 5** whole body	**DAY 6** rest	**DAY 7** rest
Intermediate	6 day	upper, lower each 3 days per week	**DAY 1** lower body	**DAY 2** upper body	**DAY 3** lower body	**DAY 4** upper body	**DAY 5** lower body	**DAY 6** upper body	**DAY 7** rest
	5 day	upper, lower one 3 days, the other 2 days per week (weak area three days)	**DAY 1** lower or upper body	**DAY 2** upper or lower body	**DAY 3** lower or upper body	**DAY 4** rest	**DAY 5** upper or lower body	**DAY 6** lower or upper body	**DAY 7** rest
Advanced	6 day	each body part 2 days per week	**DAY 1** lower body	**DAY 2** back chest	**DAY 3** shoulders arms	**DAY 4** lower body	**DAY 5** back chest	**DAY 6** shoulders arms	**DAY 7** rest
	4 day	each body part 2 days per week	**DAY 1** lower body	**DAY 2** upper body	**DAY 3** rest	**DAY 4** lower body	**DAY 5** upper body	**DAY 6** rest	**DAY 7** rest

Fig. 6-2

Notice that exercise order during the splits still follows the Interdependency Principle. You always train lower body before upper, and, even when the workout is spread over three days, you train from the center of the body outward. The principle of "not working a muscle as prime mover before that muscle is called on to function as synergist" is just as valid for organizing a weekly routine as for organizing a daily one.

Notice also that total training time *decreases* with experience. You drop from working each body part 3 times per week over six days, to 2 times per week over six days, to 2 times per week over four days. That's because training intensity continues to *increase* with experience. As you get stronger and lift more weight, you are by definition training at a greater intensity. **The greater the intensity, the longer each body part needs to recover between workouts to avoid losing ground due to *overtraining*.**

This is one of the most important concepts of successful bodybuilding—yet almost everyone resists it. "If a little is good, a lot must be better" is a very seductive way of thinking. But it's just flat wrong! Research has demonstrated time and time again that maintaining progress at advanced levels demands short, but intense, workouts.

Eventually—in about your fifth or sixth year—you should be working each body part no more than two times per week. If you have already been training at least four years and presently work each body part three times per week, try cutting back to two and see if your rate of growth doesn't increase!

- **Beginners should work the *whole body* three days per week, with at least one rest day between workouts. You can choose either program from the Routines Section. Both are suitable for whole-body-on-the-same-day-training.**
- **Advanced bodybuilders and those who have been training for six months to a year should be using a *split routine* if time permits. The *Bodybuilder Power, Condensed* Program is not suitable for this approach. Use the *Expanded* routines, Level 1 and up.**

OVERTRAINING, AND THE MONTHLY/YEARLY ROUTINE

We've mentioned **overtraining** several times in the last few pages. Since it plays the key role in the arrangement of the monthly and yearly schedules, let's now hit the nail squarely on the head.

Overtraining occurs when you subject your body to more stress than it can handle, on a prolonged basis. Getting bigger and stronger is actually just your body "handling"—adapting to—the stress imposed by lifting weights. If you overdo your training, the adaptive mechanism breaks down, and instead of getting bigger and stronger, you get listless, irritable, run down—and weaker.

This doesn't happen overnight. It is a slow process, usually the result of months or years of pushing too hard. (And it's often accompanied by such questionable logic as, "I've been feeling so run-down lately; guess I need to work out harder....")

Granted, it's a delicate balance: to progress you must push, get out one more rep, crank out one more set—indeed, tread the fine line between enough and too much. Enthusiasm makes it easy to step over that line.

To offset the effects of occasional excess, you should stagger the intensity of your workouts and take periodic breaks.

That doesn't mean skipping every other session (consistency is a necessary ingredient for progress). It does mean paying attention to the way you feel as you train and settling on a schedule that keeps you energized and strong. **You will probably find you need to take off one or two days once a month to maintain your energy level. Likewise, you will probably find that, once a year, it's not a bad idea to skip a full week or two.** Vibrant health requires a balance of appropriate diet, exercise, ***and rest.***

Besides, you'll grow like crazy during that time off!

- **To avoid overtraining, take off one or two days per month, and one or two weeks per year.**
- **Maximum growth—and vibrant health—requires a *balance* of intense exercise and rest. Train hard. But remember: you grow while resting, not while working.**

* * *

That's it! All that's left is for you to go out and actually use the material we have covered.

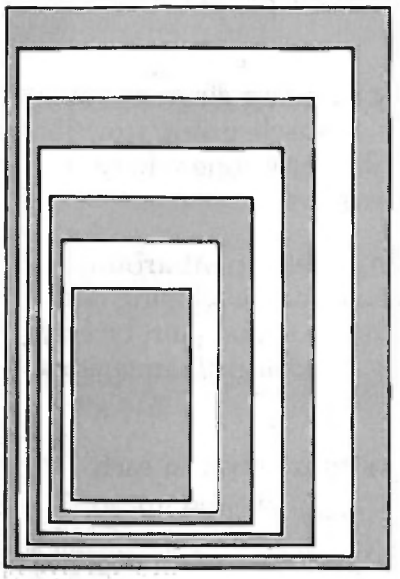
Remember, there are three ways to apply the techniques:

1. Modify your own routines based on the advanced bodybuilding concepts.

2. Use the ***Bodybuilder Power, Condensed*** *or* ***Expanded*** *programs as they stand.*

3. Use our programs as templates for developing new ones of your own.

Good luck, and happy training!



APPENDIX A

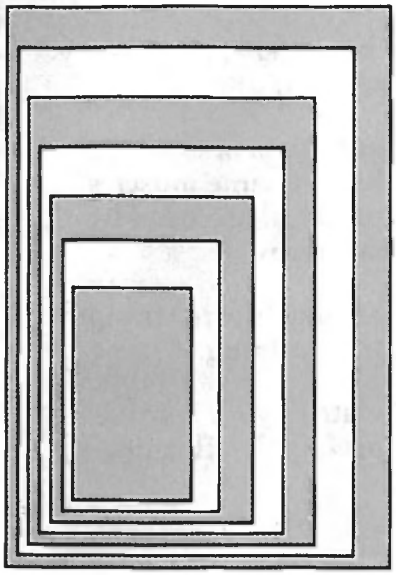
THE COMPLETE BODYBUILDING *WHOLON*

WHOLON ELEMENT	CONCERNED WITH	OPTIMIZE	IMPORTANT PRINCIPLES TO USE
Most Complex	**Monthly/ Yearly routine**	▪ Number of workouts	▪ Balance intense exercise and rest. You grow while resting, not while working. ▪ To avoid overtraining, take off one or two days per month, and one or two weeks per year.
↑	**Weekly routine**	▪ Number of days	▪ Beginners should work the **whole body** three days per week, with at least one rest day between workouts.
↑		▪ Rest between workouts.	▪ Those who have been training for six months to a year should try a **split routine**. See "split" chart, page 146.
↑		▪ Workout Sequence	▪ All Interdependency rules apply.
↑	**Daily workout**	▪ Number of body parts	▪ Depends on type of routine; see "split routine" chart, page 146.
↑		▪ Body part sequence	▪ Work from the center of the body outward.
↑			▪ When possible, do back-to-back, and without rest, exercises for a prime mover involving different synergists.
			▪ Pre-exhaust.

WHOLON ELEMENT	CONCERNED WITH	OPTIMIZE	IMPORTANT PRINCIPLES TO USE
			▪ Increase efficiency by going directly from an exercise where a muscle group functions as synergist or stabilizer to one where it functions as prime mover.
			▪ Work for balanced development around joints (equal emphasis on developing both muscles in each muscle group pair: biceps/triceps, chest/back, quadriceps/hamstrings, etc.)
			▪ When working the entire body in each workout, train from the ground up.
		▪ Rest length between body parts	▪ No rest between the last set of an exercise for one body part and the first set of an exercise for the next body part.
	Body part	▪ Number of exercises	▪ Varies depending on athlete's experience and purpose of routine. See Routines Section for examples. Basic guideline: one to two for beginners, three to seven for advanced.
		▪ Exercise selection	▪ Effective *combinations* for a particular body part employ exercises for that body part with markedly different leverage curves (i.e. Hyperextensions then Good-mornings.)
		▪ Exercise sequence	▪ Except when pre-exhausting, major body motion exercises—functional strength exercises—should precede isolation exercises.
			▪ Pre-exhaust if a synergist is likely to tire before the prime mover.
			▪ Use exercise sequence, as well as standard isolation exercises, to isolate different segments of a prime mover.
			▪ Within a body part, avoid working muscle segments as prime mover before those muscle segments are called on to function as synergists.
			▪ When working the entire body in each workout, train from the ground up.

WHOLON ELEMENT	CONCERNED WITH	OPTIMIZE	IMPORTANT PRINCIPLES TO USE
↑		▪ Rest length between exercises	▪ no rest between the last set of one exercise and the first set of the next.
↑	**Exercise**	▪ Number of sets	▪ Varies depending on exercise function and athlete's experience. See Routines section for specifics. Basic guideline: three to five sets for functional strength exercises, one to three for isolation exercises.
↑		▪ Rest length between sets	▪ Maximum 30 second rest between sets of a particular exercise.
↑			▪ Work for overall feeling of speed throughout the routine. Remember the cumulative fatigue effect.
↑	**Set**	▪ Amount of Weight	▪ Employ heavy poundages and a pace and organization that will maximize the Fatigue/Tension level.
↑		▪ Number of reps	▪ Varies with experience. Basically: 6 to 8 reps per set on upper body exercises; 8 to 10 on lower body exercises.
↑		▪ Rep speed	▪ Perform reps at medium speed in a controlled fashion; no jerking; no rest between reps.
Least Complex	**Rep**	▪ Form	▪ Select or modify exercises to use Ideal Orientation—to exactly align Line of Force with direction of resistance. Doing so minimizes joint stress and wasted energy, and maximizes concentration on the target muscle group.
			▪ Adjust exercise form so all relevant movement takes place within (or at least parallel to) the Ideal Plane of Motion for that exercise.
		▪ Leverage	▪ Select or modify exercises based on following guideline: Efficient *single* exercises pit a muscle against resistance that varies in accordance with the muscle's leverage.

* * *



APPENDIX B

OTHER TRAINING RECOMMENDATIONS

Many of the letters we get at Health For Life begin something like: "I'm a competitive bodybuilder, but I like to run a few days a week..." or "Weight lifting is my main focus, but I also practice martial arts." These letters go on to ask, "Is there some particular order in which I should be performing my different kinds of training?"

The answer is—Yes!

Just as there is a synergistic sequence for exercises within a routine, there is also a synergistic sequence for your overall training program. The rules are simple:

1. **Warm up first.** Regardless of whether you are going to lift weights or throw two hundred punches, you have to make the transition between inactivity and exercise gradually.

A warm-up consists of three parts: limbering up, cardio-vascular warm-up, and specific muscular warm-up.

Limbering up is **not** the same as stretching to increase flexibility. It involves going through a short series of stretching exercises (like our **SynerStretch A** routine) **without pushing yourself.** Limbering up is the first step in the transition between inactivity and exercise.

For the cardiovascular warm-up, you can use anything that gets your blood pumping—running, riding a stationary (or non-stationary) bike, jumping rope, running in place, etc. This is stage two.

Finally, you need to prepare your muscles and joints for the specific activity in which you are about to engage. If you are going to punch the heavy bag, throw some easy punches in the air. If you are going to lift weights, pick up a pair of very light dumbells and run through the exercises from your routine.

2. **Do exercises that involve the same muscles on the same days.** For example, if you're going to both bodybuild and run, run on the days you work your legs. For some reason, everybody does exactly the opposite—they run on the days in between their leg workouts. As a result, their legs **never** get to rest and recover!

Combining running and leg work on the same day is synergistic. Running before a leg workout thoroughly warms up the lower body, decreasing your risk of injury. It also pre-exhausts the legs, allowing you to get maximum growth using less weight. (Remember, it's not the *amount* of weight you lift that counts, it's the Fatigue/Tension level developed in the muscle.)

Here are some other combinations of exercises that use the same basic muscles, and should be performed on the same day:

- ☐ martial arts kicking/lower body work
- ☐ martial arts punching/upper body work
- ☐ soccer/lower body work
- ☐ parallel bars or rings/upper body work

...and so on.

3. **Do *skill* work before *strength* or *endurance* work.** For example, practice martial arts kicking *before* working lower body; practice your racquetball serve *before* doing upper body. If you don't, you condition sloppy body movements into your nervous system instead of controlled ones.

4. Finally: **Stretch as late in your routine as possible.** Stretching is not a warm-up exercise! Pushing to increase your flexibility when you are cold is like flattening out a rusty hinge with a hammer. It creaks and groans, and won't open very far anyway.

The best time to stretch is after you finish lifting. All that pumping is like putting oil on the hinge. In fact, if you stretch after lifting, you will develop more flexibility more quickly, experience much less of the pain usually associated with stretching, and suffer less soreness from your weight workout![†]

We *strongly* recommend you include upper and lower body stretch routines at the end of your weight workouts.

- **Warm up before engaging in any physical activity.**
- **Do different kinds of exercises that involve the same muscles on the same days, preceded by specific warm-ups.**
- **Do skill training before strength or endurance training.**
- **Stretch as late in your routine as possible, preferably after lifting weights.**

Examples:

On lower body day you might...

A. Warm-up (limber up, jog in place)

B. Run (continue warm-up, lower body pre-exhaust)

C. Practice soccer or martial arts kicks (skill work)

D. Work Lower Body with weights

E. Stretch Lower Body

On upper body day you might...

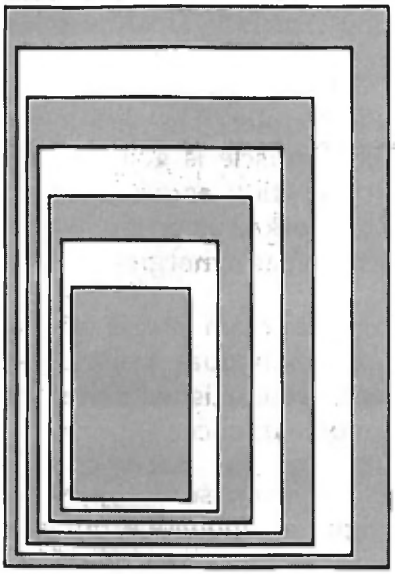
A. Warm up (limber up; row, swim, or ride stationary bike with low resistance so as not to tax the legs much)

B. Practice racquetball serve, martial arts punches (skill work)

C. Work Upper Body with weights

D. Stretch Upper Body

†See our *SynerStretch* course for information on state-of-the-art stretching techniques.



GLOSSARY

Abs: Abdominal muscles, the muscles responsible for flexing the trunk.

Abduction, shoulder: Raising your arm out to the side.

Abduction, hip: Raising your leg out to the side.

Adduction, shoulder: Starting from an abducted position, bringing your arm down to your side.

Adduction, hip: Starting from an abducted position, bringing your leg down to the ground.

Agonist: Also called "prime mover," the main muscle or muscle group responsible for a given movement.

Antagonist: A muscle paired with a prime mover that provides motion exactly opposite to that provided by the prime mover. Example: the tricep, which straightens the elbow, is the antagonist of the bicep, which bends the elbow.

Balanced Development: Proportional development of the strength of an agonist/antagonist pair around a joint.

Extension, elbow: Straightening the elbow.

Extension, hip: Starting with your leg up off the ground and pointing straight forward, lowering your leg to the ground.

Extension, knee: Straightening the knee.

Extension, shoulder: Starting with your arm pointing straight out in front of you, bringing your arm down to your side.

Extension, trunk: Straightening the trunk.

Fan-shaped muscle: A muscle whose fibers converge at one end and diverge at the other, and therefore don't all run in the same directon. Examples: the pecs, traps, or lats. The line of force for a fan-shaped muscle can change, depending on which muscle fibers in the fan are being activated.

Fatigue/Tension Level: The degree of exhaustion of a muscle at any given point in an exercise.

Fatigue/Tension Threshold: The minimum Fatigue/Tension level necessary for growth.

Flexion, elbow: Bending the elbow.

Flexion, hip: Bringing the leg up and forward.

Flexion, knee: Bending the knee.

Flexion, shoulder: Bringing the arm up and forward.

Flexion, trunk: Bending the trunk.

Functional Strength: The ability of the body to bring a coordinated muscular effort to bear on external resistance in everyday situations, such as moving a refrigerator.

Functional Strength Exercise: Exercises that most closely duplicate movements in everyday life.

Glutes: Group name for the gluteus maximus (which straighten the hip) and the gluteus medius and minimus (which rotate the leg and move the leg out to the side).

Hamstrings: Three muscles of the posterior thigh—the semimembranosus, the semitendinosus, and the biceps femoris. The hamstrings are responsible for straightening the knee.

Hyperextension: Moving beyond fully straightened. Example: *hyperextending* the back involves bending backward beyond the point where the torso is fully upright.

Ideal Orientation: The positioning of a muscle-bone leverage system such that the line of force is exactly opposite the direction of resistance, and ligamentous strain is minimized.

Ideal Plane of Motion: The plane of motion defined by movement from Ideal Orientation.

Infraspinatus: A muscle of the back which pulls the arm toward the shoulder blade.

Interdependency of Muscle Groups: The principle stating that individual muscles never act alone.

Interdependency Principle: The priniciple stating that, if a muscle is going to be called upon to function as a synergist, it should not be worked as prime mover prior to functioning as synergist.

Isolation: Focusing the main stress of an exercise on an individual muscle or muscle segment, accomplished either by exercise design or sequence.

Isolation Exercise: An exercise designed to selectively fatigue an individual muscle or muscle segment.

Kineseology: The scientific study of the mechanics of human movement.

Lats: The latissimus dorsi, a fan-shaped muscle of the back. The latissimus dorsi pulls the arm down and back.

Lever: A device in which force is transmitted through a bar pivoting at a point to act against resistance (move a weight). In the human body, all actions of the musculoskeletal system occur through levers, where *muscle contraction* is the force, *bone* is the bar, *joint* is the pivot point, and *external resistance* is the weight.

Leverage: The mechanical advantage provided by the placement of elements in a lever system.

Line of Force: The line of contraction for a muscle segment.

Load: The opposition to motion provided by resistance.

Major Body Motion Exercises: Functional strength exercises.

Muscle Fatigue: The decreased capacity of a muscle to contract as the result of previous exertion; a function of overload and timing.

Muscle Fibers: Tiny strands of muscle tissue that can shorten (contract) as a result of a chemical reaction.

Muscle Segment: A collection of millions of muscle fibers all pulling in the same directon and acting as one unit.

Obliques: Abdominal muscles whose fibers run diagonally, and are responsible for twisting motions of the trunk.

Optimization: Maximizing output for a given input.

Overloading: Forcing a muscle to act against resistance greater than that which it can easily overcome, to encourage growth.

Pecs: The pectoralis major and minor, fan-shaped muscles of the chest. The pectoralis major can be thought of as consisting of three muscle segments—the *upper* pecs, which pull the arm up across the chest, the *middle* pecs, which pull the arm straight across the chest, and the *lower* pecs, which pull the arm down across the chest. The pectoralis minor pulls the shoulder blade out and forward.

Pre-Exhaustion: Performing an exercise to tire a prime mover without tiring the prime mover's synergists.

Prime Mover: The main muscle or muscle group responsible for a given movement.

Pronation: Rotation of the forearm resulting in the hand facing palm down.

Quads: The quadriceps, four muscles of the anterior thigh—the Rectus Femoris, the Vastus Lateralis, Vastus Medialis, and Vastus Intermedius. The quadriceps are responsible for straightening the knee.

Resistance: The opposition to motion resulting from the combined effect of load and leverage.

Resistance Curve: A graph depicting how resistance varies with changing angle at a joint.

Stabilizers: Muscles holding the body in position so the prime mover and synergists can act.

Straight muscle: A muscle whose fibers all run in the same direction. Example: the bicep. As opposed to a fan-shaped muscle, which has several lines of force, a straight muscle only has one line of force.

Strength Curve: A graph depicting how tension generated by a muscle varies with changing angle of a joint.

Supine: Lying flat on your back.

Supination: Rotation of the forearm resulting in the hand facing palm up.

Supraspinatus: A muscle of the back which pulls the arm away from the side.

Synergism: Combining elements to create a whole greater than just the sum of those elements.

Synergists: Muscles assisting a prime mover.

Synergist-Dependent Exercise: An exercise that employs synergists.

Tension: Muscular contractile force.

Teres Group: The teres major and teres minor, two muscles of the back which pull the arm toward the shoulder blade.

Timing: The combination of repetition speed, rest length between sets, and rest length between exercises.

Traps: The trapezius, a fan-shaped muscle of the back. The trapezius can be thought of as consisting of three muscle segments: the upper traps, which raise the shoulder blades, the middle traps, which pull the shoulder blades closer together, and the lower traps, which pull the shoulder blades down.

Wholon: A system consisting of many elements, progressing from simple to complex. Each element is a whole unto itself. Within the system, each more complex element is built out of the simpler ones.

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ISBN 0-944831-07-9

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